

# ABSTRACT

OF

The Proceedings of the Association of  
Life Insurance Medical Directors of  
America for the Twenty-sixth and  
Twenty-seventh Annual Meetings

PRINTED FOR PRIVATE CIRCULATION

NEW YORK

The Knickerbocker Press

1917

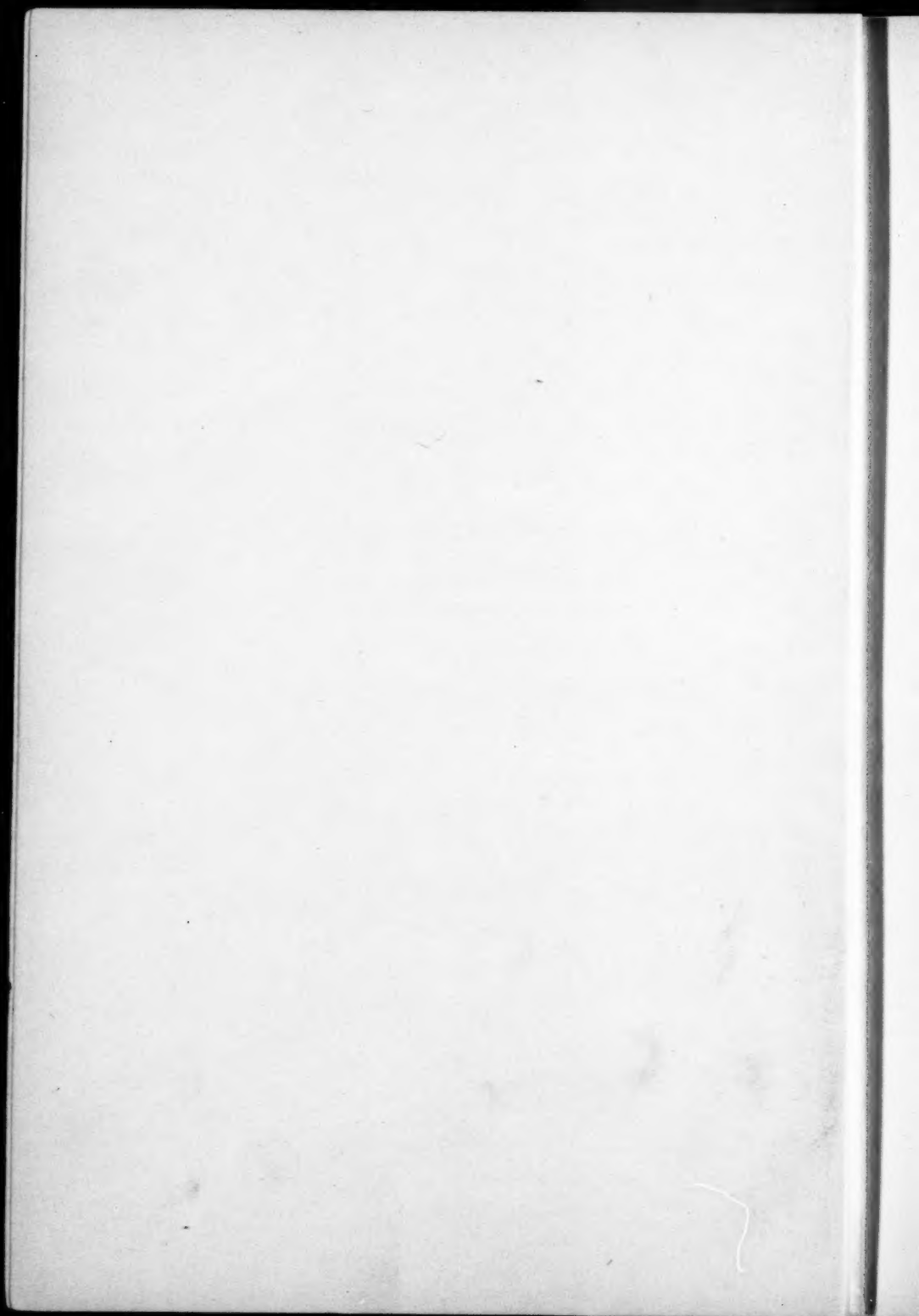
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THE ASSOCIATION OF LIFE INSURANCE  
MEDICAL DIRECTORS OF AMERICA



Compiled by the Secretary  
By  
Order of the Association



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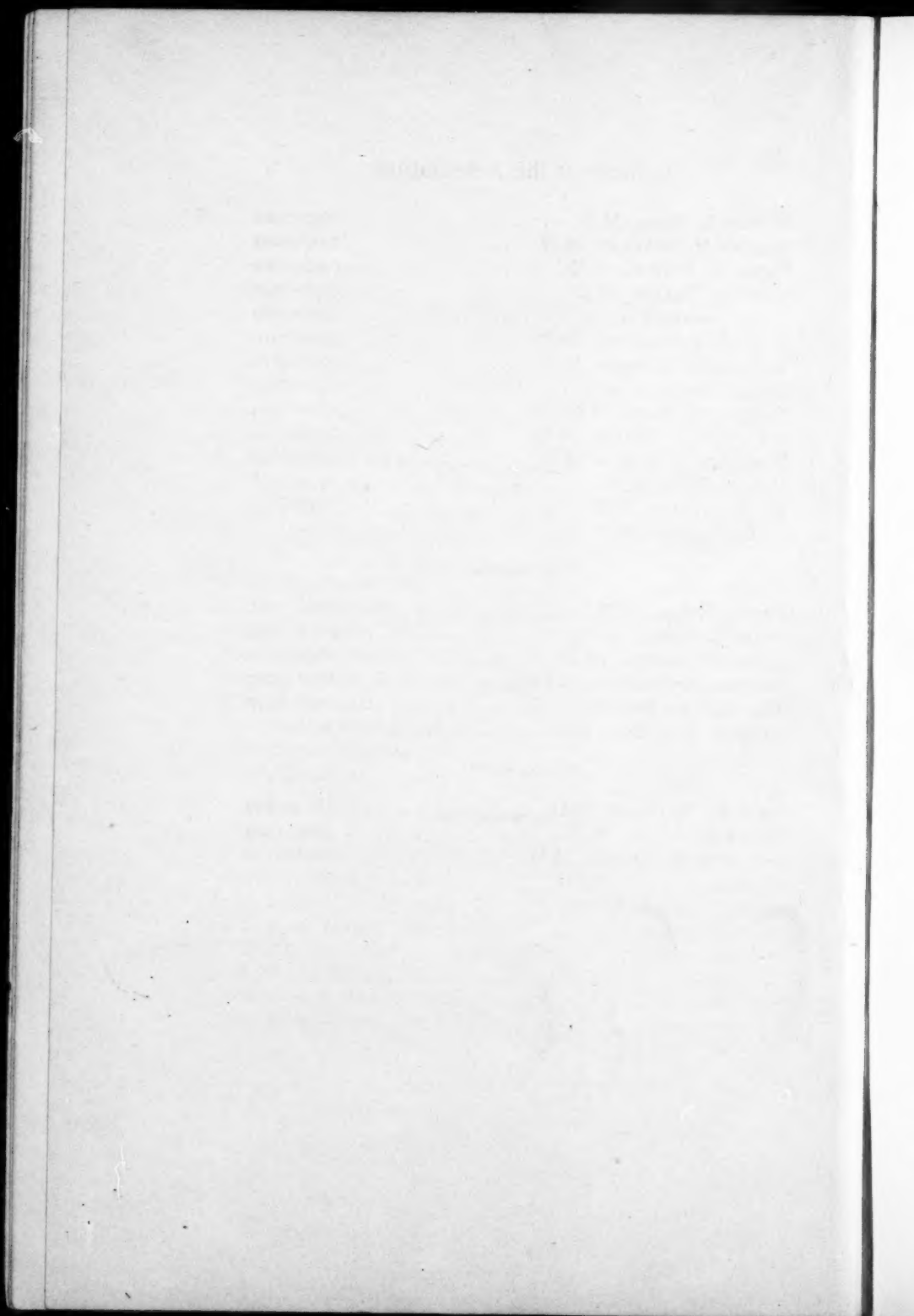
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An Abstract of the Proceedings  
OF THE  
Association of  
Life Insurance Medical Directors  
of America.

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TWENTY-SIXTH ANNUAL MEETING

The Twenty-Sixth Annual Meeting of the Association of Life Insurance Medical Directors of America was held in the Board Room of the Mutual Life Insurance Company of New York, No. 32 Nassau Street, New York City, on October 14 and 15, 1915. President William Evelyn Porter in the chair.

Roll-call showed a quorum present. The following members were present at some time during the sessions:

Henry A. Baker, W. B. Bartlett, W. W. Beckett, A. W. Billings, David N. Blakeley, Laurence D. Chapin, Charles L. Christiernin, Henry Wireman Cook, R. M. Daley, C. R. Dudley, Edwin W. Dwight, Z. Taylor Emery, J. W. Fisher, Paul Fitzgerald, Homer Gage, F. L. Grosvenor, George C. Hall, J.

B. Hall, A. B. Hobbs, E. M. Holden, W. G. Hutchinson, W. A. Jaquith, M. L. King, W. W. Knight, R. L. Lounsberry, C. B. McCulloch, T. F. McMahon, F. D. Merchant, William D. Morgan, William Muhlborg, Ralph B. Ober, J. B. Ogden, J. H. North, J. Allen Patton, J. S. Phelps, William Evelyn Porter, T. H. Rockwell, O. H. Rogers, Edwin K. Root, R. L. Rowley, E. E. Russell, H. C. Scadding, H. H. Schroeder, Brandreth Symonds, P. E. Tiemann, G. A. Van Wagenen, H. A. Wardell, Wm. Perry Watson, J. H. Webb, W. H. Wehner, Faneuil S. Weisse, E. A. Wells, F. C. Wells, C. F. S. Whitney, George Wilkins, Gordon Wilson, Glenn Wood, A. B. Wright, George J. Wright.

The total attendance at all sessions was fifty-nine.

The names of the following candidates for membership recommended by the Executive Council were presented:

T. C. Denny, M.D., Central Life, Des Moines, Iowa.

Henry K. Dillard, M.D., Penn Mutual Life Insurance Company, Philadelphia, Pa.

Lewis F. MacKenzie, M.D., Prudential Life Insurance Company, Philadelphia, Pa.

Henry A. Martelle, M.D., Connecticut Mutual Life Ins. Co., Hartford, Conn.

Herbert Old, M.D., Provident Life & Trust Company, Philadelphia, Pa.

Spotswood H. Parker, M.D., Travelers' Life Insurance Company, Hartford, Conn.

Albert T. Post, M.D., Equitable Life Assurance Society, New York, N. Y.



Albert Seaton, M.D., State Life Insurance Company, of Indianapolis, Ind.

D. W. Smouse, M.D., Central Life, Des Moines, Iowa.

It was moved, seconded, and carried that the Secretary be instructed to cast a ballot in favor of each of the candidates named. Ballots were so cast, and the candidates declared elected.

The newly elected members present were escorted into the room by Drs. Wright and Jaquith, and introduced. General applause greeted their arrival.

The Secretary read the minutes of the meetings of the Executive Council held on November 11, 1914, January 29, 1915, April 8, 1915, October 14, 1915. On motion these minutes were approved as read.

Motion was made and carried that the reading of the minutes of the last Annual Meeting of the Association be waived.

Dr. Porter—The next order of business is the reading of the President's address. A few points came up within the past year which I think warrant a little comment, and I have prepared a few remarks which I think would hardly be dignified by the term of an address.

After two most profitable and enjoyable meetings, held in neighboring cities, I take pleasure in welcoming you back to New York for this, the twenty-sixth annual meeting of the Association. Through the courtesy of Mr. Charles A. Peabody, President of the Mutual Life, the hospitalities of the Company are extended to the members of the Association during its sessions; and I trust that you may all feel at home and derive full measure of enjoyment and profit while here.

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In completing my ninth year as an Executive Officer of your Association, I wish to express my deep appreciation of the confidence shown and honor conferred by your choice.

It is with profound regret that I report the death of an esteemed member of our Association, Dr. Allison Maxwell, Medical Director of the State Life Insurance Company of Indianapolis. The Doctor was a man of high professional attainments, having served as Dean of the Central College of Physicians and Surgeons and the School of Medicine of Indiana University. He has taken an active interest in our work since his election in 1909 and his death will prove a great loss.

The absence of a number of our members who have gone to the front, deserves our serious thought and I am sure I voice the sentiment of all in wishing them strength to withstand the trying ordeals through which they may pass and in expressing the hope that they may return in safety to resume the places in their respective professional positions.

This year has been the most eventful in our history, owing to the completion of the work of the Medico-Actuarial Committee. It marks the opening of a new era in our activities and places us among the leading scientific organizations of the world.

To the new members a few facts concerning the inception and subsequent development of this work may be of interest. At a meeting of the Executive Council, held November 14, 1907, Drs. Symonds, Root, Toulmin, and Dwight were appointed to act as a Special Committee, under the direction of the Executive Council, to formulate plans and arrange details for the study of impaired lives. This Committee held its first meeting on July 9, 1908, electing Dr. Dwight, Chairman and Secretary. On June 29, 1909, Drs. Rogers and Willard became members of the Committee. On October 5, 1909, a Joint Committee from the Medical Directors Association and Actuarial Society was formed, consisting of Drs. Willard, Rogers, Symonds, and Dwight, and Messrs. Gore, Rhodes, Hunter, and Welch. Subsequently, a Central Bureau

was established, in charge of Mr. Arthur Hunter, Dr. Symonds being the medical representative. The work accomplished by these gentlemen has been stupendous and will stand out preëminently as one of the most valuable contributions in the history of our profession. The published volumes, already in your hands, speak for themselves and, as your President, I feel it my duty and privilege to place upon our files an expression of appreciation of the great work which the Committee has accomplished, not only for our Association but the insurance world at large.

With this in mind, particular attention has been given to the planning of the program for this meeting. In order that the start may be made along most desirable and correct lines, I have arranged with a member, well fitted for the task, to outline suggestions as to methods to be followed in utilizing the material contained in the report of the Medico-Actuarial Committee, and will call upon those well qualified in the medical and actuarial professions to discuss the paper. Without the benefit of the enlightenment which is bound to result from this presentation, I was somewhat at a loss to know in what manner I might best serve this Association in my opening paper. Ascertaining that the Joint Committee had been unable to collect adequate material for a full report upon the subject of the comparative mortality among abstainers and non-abstainers from alcohol, I decided to contribute the experience of our Company during a recent period, calculated and tabulated as closely as possible along the lines followed by the Joint Committee, and trust that the course thus initiated may be in line with suggestions which are to follow.

At a meeting of the Executive Council held at Hartford, October 7, 1914, it was voted that inscribed copies of the report of the Medico-Actuarial Investigation be presented to each active member of the Joint Committee for their personal use. On the evening of February 26, 1915, a dinner was held at the Hotel Martinique, copies of the transactions were presented, and an appropriate silver piece given to Mr. Arthur Hunter, in recognition of the valued services rendered in

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completing this masterly work, which is bound to stand out as a classic in life insurance history.

I am sure we all realize, as Medical Directors, the importance of a correct knowledge of peptic ulcer in relation to the expectancy of life. Its importance is emphasized by the magnitude of the accumulated literature upon the subject, rendering it altogether too large to be covered by a single paper. I have arranged, therefore, for a symposium covering the medical, surgical, and roentgenological aspects, considered separately, and am confident the results of the papers and accompanying discussion will prove of inestimable value to the profession.

The widespread interest taken in conservation work makes it a timely subject for our consideration and discussion, and I am especially pleased that our able Vice-President has consented to present some facts bearing upon its relation to life insurance activities.

The value of well-organized laboratory work, and a careful record and tabulation of results, will be emphasized in the paper to be presented by Dr. Ogden of the Metropolitan Life Insurance Company, and I hope all who may be following similar lines of practice in this direction will participate in the discussion.

In recent years, the question of blood pressure has received world-wide attention, and probably no one has contributed more to the subject from the life insurance standpoint than our fellow member, Dr. Fisher, who is to present a report of his observation up to the present time. As he has held the center of the stage so long, however, I decided to accept the kind offer of one of our younger members, to come before the limelight and present the subject with special reference to the diastolic. In addition, Dr. Paul E. Tiemann will contribute some valuable data in discussion, under the title—"Arterial Tension in Connection with Cardiac Murmurs."

Before reading my paper, I desire to announce the fact that the responses to the request for prepared discussions of papers have been most gratifying and I take this opportunity of

thanking those members who showed sufficient interest in the scientific work of the Association to respond to the call. To those who have not responded, I would state that each and everyone is earnestly requested to say, at least, a few words giving his experience, or views, on one or more of the varied subjects to be taken up at this meeting.

The balloting for nomination of officers was next in order. Doctors Cook and Root were appointed as tellers and distributed the ballots.

In the absence of Dr. Knight, the Secretary read the report of the Treasurer. After being duly audited by Dr. Gordon Wilson and Dr. Lounsberry, the report was accepted and placed on file with a vote of thanks to the Treasurer.

Dr. Rogers read the report of the M. I. B. Committee. On motion, the report was accepted as read and placed on file, with a vote of thanks to the Chairman for his care and trouble in preparing the report.

Dr. Dwight announced that the Committee on Joint Investigation had no report to make.

Dr. Porter—We will have a report from Dr. Beckett, delegate to the World's Insurance Congress. I might say that Dr. Beckett attended some of the preliminary meetings and Dr. Knight was appointed by the President as his deputy, as Dr. Beckett was good enough to come here to participate in the discussion of Dr. Cook's paper. It seems that Dr. Knight has arranged with the Assistant Medical Director of his Company to represent him, as a change was made in the plans of Dr. Knight's Com-

pany in connection with his trip, subsequent to his appointment as deputy to Dr. Beckett.

Dr. Beckett—It was my pleasure to attend the meetings of the World's Insurance Congress in San Francisco last week. I had to leave before it was entirely over in order to reach this meeting. The Congress was very lightly attended, for the reason that when people come from a distance to San Francisco at this time they are more interested in the Fair than they are in listening to dry papers. However, the papers that were presented, and of which you will undoubtedly get copies, were very interesting. I think the movement is really one in the right direction. Whether or not it will be made permanent was a question when I left. At any rate the Executive Board told me that they were trying to collect sufficient funds to have the papers and the proceedings of the Executive Committee published and sent to the members of the different Societies, which I hope will be done. Mr. Hathaway, who is President of the World's Insurance Congress, has worked very diligently and very hard indeed, and he should have a vote of thanks from all the different Associations for the admirable way in which he has conducted this Congress. I think I have nothing further to report. Thank you very much.

Dr. Rockwell—I should like to move the acceptance of Dr. Beckett's report and in this connection I wish to say that I would like to thank Dr. Beckett publicly for the courtesies that were extended to me as Medical Director of the Equitable as well as to the Medical Directors of other Companies, when

we were so far away from home, on the Pacific Coast. He extended to us the use of his offices, and our ability to get hold of M. I. B. reports often saved us a very considerable delay. He and his officers have been uniformly courteous to visitors.

Motion seconded and carried.

Dr. Beckett—I would like to say that I never believe a person should have any credit for being courteous, especially to exceedingly courteous people. Our only regret is that we are so far away. Your visits are so exceedingly few and far between! We should be delighted to have any of you call at any time and not only see our office but see our Western coast and ride over some of our beautiful roads.

I would like to move that Mr. Hathaway, President of the World's Insurance Congress be tendered a vote of thanks from this Association for the courtesies which he has extended to this Association and for the admirable way in which he has conducted his office during this Convention which has just passed.

The motion was seconded and carried, and the Secretary instructed to send a copy of the resolution to Mr. Hathaway.



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President William E. Porter then read the following paper entitled:

COMPARATIVE MORTALITY EXPERIENCE AMONG  
ABSTAINERS AND NON-ABSTAINERS  
FROM ALCOHOL.

BY WM. EVELYN PORTER, M.D.

*Medical Director of The Mutual Life Insurance Co. of N. Y.,  
President of The Association of Life Insurance Medical  
Directors of America.*

During no period in the history of the world has the question of the effects of alcohol been so generally considered by all classes of people as during the past year. The rulers of most of the great nations, statesmen, commanders of the army and navy, scientists and philanthropists have all given it serious consideration and study. Statisticians have aided in the work, but unfortunately the Medico-Actuarial Committee were unable to include in their presentation material which would, undoubtedly, have furnished the most accurate scientific data bearing upon this important subject.

As the Mutual Life Insurance Company of New York, through its able Actuary, Mr. Emory McClintock, was the first Company in the United States to present statistics of definite value on the subject, it seemed appropriate at this time to present the latest experience of the same Company, calculated and tabulated along the lines followed by the Medico-Actuarial Committee in their report. Although the volume of material is not large, care has been taken to make it homogeneous and as free as possible from sources of error likely to affect its scientific value. To eliminate conflicting elements, manifest as a result of habitat, the consideration, confined to Domestic Males, eliminated those residing in South Carolina, Georgia, Florida, Mississippi, Arkansas,



# Porter—Mortality from Alcohol

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Louisiana, Oklahoma, and Texas. To avoid the errors due to the influence of certain occupations, it has been divided for study into five occupation classes having the largest number of entrants, as follows:

TABLE A.

ISSUE OF 1907-1912.

DOMESTIC MALES.

CLASS	OCCUPATION	INSURED		PER CENT. OF TOTAL ENTRANTS	
		No.	Amount	No.	Amount
224	Indoor Clerical Service.....	15,402	\$ 27,522,750	9.3	5.9
226	Merchants and Dealers.....	22,379	76,704,200	13.6	16.6
229	Salesmen (not in liquor business).....	13,132	24,495,225	8.0	5.3
233	Farmers.....	27,859	50,569,450	16.9	10.9
240	Factories and Mills-Proprietors, Managers and Superintendents.....	5,824	33,475,825	3.5	7.2
	TOTAL.....	84,596	\$212,767,450	51.3	45.9

These five classes constitute about one-half of the total number of entrants and are divided into three groups, namely: (1) Total Abstainers; (2) Temperate (occasional but not daily users) and (3) Moderate (steady, free, though not excessive users).

I will next present Table "B" containing the five occupation classes referred to, that each may be considered in detail.

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TABLE B.

ISSUE OF 1907-1912. EXPOSURE OF 1907-1913.

SUMMARY: ALL AGES—POLICY YEARS 1-6 BY THE M. A. TABLE.

## CLASS 224—INDOOR CLERICAL SERVICE.

ON APPLICATIONS					ON AMOUNTS				
	Expos.	DEATHS		Ratio	Exposures	DEATH-CLAIMS		Ratio	
		Act.	Expec.			Actual	Expected		
Total Class.....	39,657	90	192.110	46.9	\$70,181,730	\$174,700	\$345,864	50.5	
Total Abstainer.....	16,979	37	76.816	48.1	26,726,975	61,600	122,549	50.3	
Temperate.....	19,926	44	99.790	44.0	38,139,375	90,600	193,151	46.9	
Moderate.....	2,752	9	15.504	58.1	5,315,400	22,500	30,164	74.5	

## CLASS 226—MERCHANTS AND DEALERS.

Total Class.....	58,090	243	389.150	62.5	\$197,852,400	\$1,058,900	\$1,491,042	71.1	
Total Abstainer.....	16,565	42	104.400	40.2	41,421,125	91,800	281,634	32.6	
Temperate.....	34,616	103	236.324	69.1	125,879,200	868,300	949,396	91.2	
Moderate.....	6,909	38	48.426	78.7	30,552,075	98,800	260,012	38.0	

## CLASS 229—SALESMEN (NOT IN LIQUOR BUSINESS).

Total Class.....	32,157	97	159.918	60.6	\$59,569,825	\$192,400	\$307,907	62.5	
Total Abstainer.....	11,443	30	52.144	57.6	16,922,400	43,200	78,997	54.9	
Temperate.....	17,985	55	93.256	58.9	36,541,125	123,200	195,005	63.2	
Moderate.....	2,729	12	14.518	82.7	6,106,300	26,000	33,905	76.7	

## CLASS 233—FARMERS.

Total Class.....	65,399	243	374.109	64.9	\$116,901,250	\$467,300	\$709,017	65.9	
Total Abstainer.....	32,026	103	170.966	60.3	53,510,400	211,000	304,399	69.4	
Temperate.....	32,315	133	196.122	67.8	60,798,850	244,800	388,674	62.9	
Moderate.....	1,058	7	7.021	99.4	2,592,000	11,500	15,944	72.1	

## CLASS 240—FACTORIES & MILLS—PROPS., MGRS. & SUPTS.

Total Class.....	15,718	76	114.365	66.4	\$88,672,725	\$358,600	\$709,895	50.6	
Total Abstainer.....	3,651	17	26.014	65.5	16,020,225	66,600	120,042	55.5	
Temperate.....	10,133	53	74.645	71.0	60,966,525	279,500	504,909	55.3	
Moderate.....	1,934	6	13.706	43.7	11,685,975	12,500	84,944	14.8	

TABLE B.—Continued

TOTAL CLASSES 224, 226, 229, 233 &amp; 240 COMBINED.

Total Class . . . . .	211,021	749	1229.652	60.9	\$533,177.950	\$2,251,900	\$3,563,725	63.3
Total Abstainer . . . . .	80,664	229	430.340	53.4	154,601.125	474,200	907,621	52.2
Temperate . . . . .	114,975	448	700.137	64.1	322,325.075	1,006,400	2,231,135	72.0
Moderate . . . . .	15,382	72	99.175	72.7	56,251.750	171,300	424,969	40.3
Tot. Non-Abstainer . . . . .	130,357	520	799.312	65.0	\$378,576.825	1,777,700	2,656,104	66.8

Class 224 represents those engaged in indoor clerical service, numbering 15,402, insured by the Mutual Life during the six years from 1907 to 1912, which is 9.3% of the total number of entrants. The average amount insured was \$1,787, and the average amount of death claim paid was \$1,941. There were ninety actual deaths as against 192.1 expected deaths, the ratio of actual to expected being 46.9% by number and 50.5% by amount. Dividing these into three groups, it is found that 6,523 Indoor Clerks, or 42.3% of the total number, who on entering claimed to be abstainers, gave 37 actual deaths and 76.8 expected, a mortality ratio of 48.1% by number and 50.3% by amount. The 7,878 Temperate, representing 51.1% of the total clerks, gave 44 actual and 99.8 expected, a ratio of 44.0% by number and 46.9% by amount. The 1001 entrants, or 6.5% who stated that they drank daily but not in excess of the medical limit, showed 9 actual and 15.5 expected deaths, a mortality ratio of 58.1% by number and 74.5% by amount. The superiority of the Temperate group to the Total Abstainers in this class is difficult to account for. A study of the cases shows that there were 2 deaths from diabetes among the Abstainers and none among the Temperate; 3 deaths from apoplexy and 3 from heart disease among the Abstainers and only 1 of each among the Temperate; 2 deaths from appendicitis among Abstainers and none among the Temperate, and, lastly, 3 suicides among the Abstainers and only 2 among the Temperate. These factors alone would account for part of the difference, and it is possible that some

of those claiming to be abstainers made false statements as to habits when applying for insurance, or, on the other hand, were abstainers because of impairments concealed from the examiner.

Class 226, Merchants and Dealers, represents 22,379 insured, or 13.6% of the total number of entrants with an average amount insured of \$3,428, and death claims paid \$4,358. The 243 actual as against the 389.2 expected deaths show a ratio of 62.5% by number and 71.1% by amount. The 6,500 Abstainers, 29.0% of the total, with 42 actual and 104.4 expected deaths, give a mortality ratio of 40.2% by number and 32.6% by amount. The 13,332 entrants in the Temperate group, or 59.5% with 163 actual and 236.3 expected deaths, give a mortality ratio of 69.1% by number and 91.2% by amount. Finally, the 2,547 entrants in the Moderate group, with 38 actual and 48.4 expected deaths, give a ratio of 78.7% by number and 38.0% by amount. The mortality ratio of Abstainers in this class is, therefore, superior to the Temperate and the latter in turn is superior to the moderate in death-ratio but not in loss-ratio.

Class 229—Travelling Salesmen and Collectors—Not in Liquor Business. Among the 13,132 cases, or 8.0% of the total number of entrants, there were 97 actual and 159.9 expected deaths. The mortality ratio was 60.6% by number and 62.5% by amount, the average amount insured being \$1,865, and the average amount of death claims being \$1,984. Of the 4,738 Abstainers representing 36.1% of the total number, there were 30 actual and 52.1 expected deaths. The percentage of deaths was 57.6% and losses 54.9%. The 7,327 entrants in the Temperate section, or 55.8% with 55 actual and 93.3 expected deaths, gave us a mortality ratio of 58.9% by number and 63.2% by amount. Finally, the 1,067 Moderate Drinkers, 8.1%, with 12 actual and 14.5 expected deaths showed a ratio of 82.7% by number and 76.7% by amount. The difference in the death-ratio between the Abstainers and Temperate was slight, but the former shows a superiority over the latter of 8.3% in loss-ratio. The Abstainers, however,

show a superiority over the Moderate of 25.1% by number and 21.8% by amount.

Class 233, Farmers, constitutes the largest in number of entrants, being 27,859, or 16.9% of the total, but it is not the largest in amount of insurance. The average amount insured was \$1,815 as compared with \$3,428 for the Merchants and Dealers and \$5,748 for the Proprietors, Managers, and Superintendents of Factories and Mills. The actual deaths were 243, expected 374.1, the mortality ratio being 64.9% by number and 65.9% by amount. As a class it furnished the largest number of abstainers, 13,767 or 49.3%. The 103 actual and 171 expected deaths gave a mortality ratio of 60.3% by number and 69.4% by amount. In the Temperate group there were 13,633 entrants representing 48.8%, with 133 actual and 196.1 expected deaths, giving a mortality ratio of 67.8% by number and 62.9% by amount. In the Moderate group there were only 459 entrants, or 1.6% of the total in this class, giving 7 actual and 7.02 expected deaths, a mortality ratio of 99.4% by number and 72.1% by amount. The Abstainers are, therefore, superior to the Temperate group in the death-ratio by 7.5%, but inferior in the loss-ratio by 6.5%. Among the Moderate group the percentage of deaths is 39.1% above the Abstainers, but the percentage of losses is only about 3% above.

Class 240, Proprietors, Managers, and Superintendents of Factories and Mills—has 5,824 entrants, or 3.5% of the total. The average amount insured was \$5,748 and the average death-claim \$4,718, and the 76 actual and 114.4 expected deaths give a mortality ratio of 66.4% by number and 50.6% by amount. The 1,343 Abstainers, 23.1% with 17 actual and 26.0 expected deaths, show a ratio of 65.5% by number and 55.5% by amount. The 3,764 Temperate, 64.7% with 53 actual and 74.6 expected deaths, give a mortality of 71.0% by number and 55.3% by amount. On the other hand, the 717 Moderate Drinkers, or 12.3%, give 6 actual as against 13.7 expected deaths, a ratio of 43.7% by number and only 14.8% by amount, which is superior to the Abstainers by about 21.8% by num-

ber and 40.7% by amount. This is the only class in which the Moderate group is superior to both the Abstainers and Temperate and the apparent result is doubtless due to the fact that the numbers are too small to warrant any satisfactory conclusions therefrom.

The combination of the five classes gives a mortality ratio of 53.4% by number and 52.2% by amount for Abstainers; 64.1% by number and 72.0% by amount for Temperate; and 72.7% by number and 40.3% by amount for Moderate. As the mortality ratio for the aggregate experience of the five classes was 60.9% by number and 63.3% by amount, the Abstainers show a lower mortality ratio, equivalent to a decrease of 33 deaths or 4 deaths per 10,000 exposures. The Temperate show a higher ratio, which is equivalent to an increase of 22 deaths, or about 2 deaths per 10,000; and the Moderate show a still higher mortality ratio, which is equivalent to an increase of 12 deaths, or 8 per 10,000 exposures. Adding together the Temperate and Moderate groups, there is a mortality ratio for Non-Abstainers of 65.0% by number and 66.8% by amount. The non-abstainers are, therefore, inferior to Abstainers by 11.6% by number and 14.6% by amount, which is equivalent to an increase of 93 deaths, or 7 per 10,000 exposures.

A careful study of the causes of the deaths showed that, of the decrease of 33 deaths among Abstainers, 28 were from tuberculosis, cancer, apoplexy, heart disease and pneumonia combined, and 5 were from cirrhosis of the liver, Bright's disease and suicide. Among the Temperate group, the increase of 22 deaths was chiefly from cancer, apoplexy, heart disease and pneumonia combined, and 5 were from cirrhosis of the liver, Bright's disease and suicide. Of the 12 extra deaths in the Moderate group, 5 were from suicide, 3 from cirrhosis of the liver, 2 from heart disease and 1 each from pneumonia and Bright's disease.

I will next call your attention to Table "C" showing the ages at which the policies were issued.

## Porter—Mortality from Alcohol

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TABLE C.

ISSUE OF 1907-1912. EXPOSURE OF 1907-1913.

SUMMARY BY AGES—POLICY YEARS 1-6. BY THE M. A. TABLE.

## TOTAL ABSTAINERS.

ON APPLICATIONS					ON AMOUNTS				
Ages	Expos.	DEATHS		Ratio	Exposures	DEATH-CLAIMS		Ratio	
		Act.	Expected			Actual	Expected		
15-19	9,970	27	38,590	60.9	\$12,879,375	\$ 38,500	\$ 49,849	77.4	
20-29	35,251	73	145,205	50.3	56,244,475	135,100	231,075	58.2	
30-39	20,175	45	93,075	48.2	42,108,825	82,400	195,137	42.3	
40-49	10,701	37	74,069	50.0	30,610,100	98,500	211,271	46.7	
50-59	3,908	37	56,418	65.5	10,869,300	101,200	157,135	64.5	
60 & Ov.	659	10	22,383	44.6	1,889,050	18,500	62,554	29.6	
15-39	65,396	145	277,470	52.3	111,232,675	256,000	476,661	53.8	
40 & Ov.	15,268	84	152,870	54.9	43,368,450	218,200	430,960	50.6	
Total	80,664	229	430,340	53.4	\$154,601,125	\$474,200	\$907,621	52.2	

## TEMPERATE.

15-19	3,451	14	13,388	104.6	\$ 4,774,575	\$ 17,000	\$ 18,553	91.6
20-29	38,384	85	158,443	53.6	74,373,200	132,800	308,189	43.2
30-39	38,218	108	177,907	60.7	107,658,600	459,500	502,954	91.4
40-49	24,711	118	174,182	67.7	91,315,725	456,700	644,954	70.8
50-59	8,757	91	125,739	72.4	39,017,050	442,900	583,277	76.2
60 & Ov.	1,454	32	50,418	63.4	5,185,925	97,500	173,208	56.3
15-39	80,053	207	349,798	59.2	186,806,375	609,300	829,696	73.1
40 & Ov.	34,922	241	359,339	68.8	135,518,700	997,100	1,401,439	71.2
Total	114,975	448	709,137	64.0	\$322,325,075	\$1,606,400	\$2,231,135	72.0

## MODERATE

15-19	121	—	.473	—	\$ 157,375	\$ —	\$ 608	—
20-29	4,116	13	17,127	75.7	9,109,500	21,500	37,146	58.1
30-39	5,602	19	26,298	72.2	18,672,125	37,500	87,812	42.8
40-49	3,955	19	28,047	67.8	18,025,025	56,300	129,783	43.4
50-59	1,360	14	19,339	72.4	8,652,225	35,000	119,432	29.3
60 & Ov.	228	7	7,851	88.9	1,635,500	21,000	59,188	41.8
15-39	9,839	32	43,958	72.8	27,939,000	59,000	125,566	47.0
40 & Ov.	5,543	40	55,217	72.4	28,312,750	112,300	299,403	37.5
Total	15,382	72	99,175	72.6	\$56,251,750	\$171,300	\$424,969	40.3



As the limited number of deaths does not warrant the study of each class separately, they have been combined and presented so as to show the results for the three respective groups. A study of the table shows that, at every age group, the ratio of the actual to expected deaths is lower with the Abstainers than the Temperate and the mortality of the Temperate is lower than the Moderate. Considering the paucity of the data, regularity of progression at each age group cannot be expected, but the striking fact remains that there is a difference of nineteen points between the Total Abstainers and the Moderate group, and nine points between the Temperate and the Moderate group.

For the purpose of confirming in a general way the experience of the Mutual Life as to the superiority of the Abstainer class to the Non-Abstainers, I will refer briefly to a few other companies, where a similar class of observations has been reported.

The United Kingdom Temperance and General Provident Institution of England presented its mortality experience of Abstainers and Non-Abstainers, covering a period of 45 years, from 1866 to 1910 inclusive. There were 8,988 actual deaths as against 12,754 expected deaths according to the O. M. table in the Abstainer section; and 14,711 actual as against 15,794 in the Non-Abstainer section. The mortality ratio was, therefore, about 70% for the former and about 93% for the latter section, a difference of 23 points in favor of the Abstainers. In the last quinquennium, 1906-1910, which corresponds approximately with the Mutual Life experience, 1907-1912, the mortality ratio was 65% for Abstainers and 83% for Non-Abstainers, a difference of 18 points in favor of Abstainers.

The Sceptre Life Assurance Company of England submitted the mortality experience of Abstainers and Non-Abstainers for the 27 years from 1884 to 1910. There were 1214 actual and 2,311 expected deaths in the Abstainer section; and 2,674 actual and 3,352 expected deaths in the Non-Abstainer section, the mortality ratio being about 53% for the former and about 80% for the latter, a difference of 27 points. In the



period from 1904 to 1910, there were 422 actual and 871 expected deaths in the Abstainer section; and 794 actual and 982 expected deaths in the Non-Abstainer section, the ratio being about 49% for the former and about 81% for the latter, a difference of 32 points.

The Scottish Temperance Life Assurance Company of Scotland published the mortality experience of Abstainers and Non-Abstainers for the 25 years, from 1883 to 1907. It showed a ratio of 46% for Abstainers and 64% for Non-Abstainers, a difference of 18 points. There were 718 actual and 1,545 expected deaths for the former and 348 actual and 542 expected deaths for the latter. In the last quinquennium, 1903-1907, there were 298 actual and 609 expected deaths in the Abstainer and 123 actual and 223 expected deaths in the Non-Abstainer section, the mortality ratio being 49% for the former and 55% for the latter section, a difference of 6 points.

The Australian Temperance and General Life Assurance Society of Australia, in the 10 year period from 1900 to 1910, showed a loss-ratio of about 47% for Abstainers and about 76% for Non-Abstainers, a difference of 29 points in favor of Abstainers.

The Manufacturers' Life Insurance Company of Canada, as recorded in Dr. T. F. McMahon's admirable paper, read before this Association, showed a mortality ratio of about 37% for Abstainers and about 66% for Non-Abstainers, a difference of 29 points in 9 years' experience from 1902 to 1910.

Dr. E. W. Dwight, in his discussion of Dr. McMahon's paper in 1911, reported the experience of the New England Mutual Life Insurance Company as follows: Abstainers show roughly, a mortality of 59% of the American Table; Rarely Use, 71%; Temperate, 84%, and Moderate, 125%. He further presented an interesting comparison showing the results with reference to tobacco. "The Total Abstainers from tobacco had a mortality of 57% as against 59% for the Total Abstainer from alcohol; the Rarely Use, 72% as against 71% from alcohol; the Temperate, 84% as against 84% from alcohol, and the Moderate, 93% as against 125% from alcohol."

Referring to numbers, Dr. Dwight further stated: "Out of 180,000 cards, 42,700 were Total Abstainers from alcohol—at least they said they were—while the Total Abstainers from tobacco were 41,000—almost exactly the same number; 13,000 rarely used tobacco, while 20,000 rarely used alcohol."

In October, 1913, Dr. R. L. Lounsberry reported before this Association the experience of the Security Mutual Life Insurance Company with Total Abstainers, but unfortunately, did not have the results with Non-Abstainers of the same period for comparison. The total number of exposures was 24,725; Actual Losses, 80; Expected Losses by American Table, 240.58; Ratio, 33.25%. By amounts the figures were: Total Exposed to Risk, \$39,337,044; Actual Losses, \$188,160; Expected Losses, \$396,388; Ratio, 47.47%.

In the June, 1915, number of the *American Underwriter* the editor, Mr. Edward Bunnell Phelps, presented a tabulation furnished by the Actuarial Department of the Northwestern Mutual Life Insurance Company showing the mortality experience of that Company on Abstainers and Non-Abstainers for the years 1886 to 1895 inclusive, figured to the end of 1900. As the tables are of interest, in that they furnish results among beer and wine drinkers and whiskey drinkers, in separate classes, I have taken the liberty of copying them and presenting them for inspection.

A—Abstainers; B—Beer or Wine Drinkers; D—Whiskey Drinkers and  
a Few Large Users of Beer or Wine

	Number of Policies	Number of Deaths	Expected Death Loss	Actual Death Loss	Per Cent. of Expected Death Loss
<i>Ages 15 to 29</i>					
A.....	47,293	1,298	\$4,616,350	\$2,321,656	50.29
B.....	17,156	512	2,063,651	1,204,635	58.37
D.....	3,977	140	630,643	378,449	60.01
<i>Ages 30 to 39</i>					
A....	38,841	1,255	5,755,681	2,824,570	49.07
B....	17,177	598	3,336,726	1,614,659	48.39
D....	7,363	296	1,804,942	1,073,242	59.46

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A—Abstainers; B—Beer or Wine Drinkers; D—Whiskey Drinkers and  
a Few Large Uses of Beer or Wine

	Number of Policies	Number of Deaths	Expected Death Loss	Actual Death Loss	Per Cent. of Expected Death Loss
<i>Ages 40 to 49</i>					
A.....	15,802	830	\$4,351,042	\$2,212,873	50.86
B.....	6,838	405	2,546,517	1,391,599	54.65
D.....	3,952	285	1,845,384	1,157,160	62.71

<i>Ages 50 to 59</i>					
A.....	4,315	497	2,518,685	1,700,857	67.53
B.....	1,800	231	1,412,400	809,215	57.29
D.....	1,242	193	1,196,951	1,053,429	88.01

<i>Ages 60 to 69</i>					
A.....	541	130	667,418	432,213	64.76
B.....	227	51	323,072	242,244	74.98
D.....	151	34	292,204	195,026	66.74

<i>Ages 70 and upward (full paid under their new numbers)</i>					
A.....	16	14	12,953	24,842	191.79
B.....	2	1	200	94	47.00
D.....	1	0	483	0	0.00

<i>Total—All Ages</i>					
A.....	106,808	4,024	17,922,129	9,517,011	53.10
B.....	43,200	1,798	9,682,566	5,262,446	54.35
D.....	16,686	948	5,770,607	3,857,306	66.84

CLASS B	Policies	Deaths	Expected Loss	Actual Loss	Per Cent.
Under age 40..	34,333	1,110	\$5,400,377	\$2,819,294	52.21
Age 40 and over.	8,867	688	4,282,189	2,443,152	57.05
Total .....	43,200	1,798	\$9,682,566	\$5,262,446	54.35
CLASS D					
Under age 40..	11,340	436	\$2,435,585	\$1,451,691	59.60
Age 40 and over	5,346	512	3,335,022	2,405,615	72.13
Total .....	16,686	948	\$5,770,607	\$3,857,306	66.84

The ratio of actual to expected mortality for all ages among the drinkers of beer and light wines was only 54.35% as against 66.84% for whiskey drinkers, a difference of 12.49% or about

ten points less than that found between Abstainers and Non-abstainers, as an average experience of all observations quoted, with the exception of this group. It might be noted, however, that in age-groups 30 to 39 and 50 to 59, the ratios were lower in the case of users of beer and light wines than in the case of Total Abstainers, and the total ratio of actual to expected mortality was but 11.15% higher in the case of Non-Abstainers as compared with Total Abstainers. As it is stated in the article quoted that the Northwestern Mutual retained the right to cancel policies for intemperance during the lifetime of the insured, it is possible that the striking differences in their results may in a measure be accounted for by that fact. No mention is made as to the mortality table followed in compiling their figures and it has been deemed best to exclude them in estimating the approximate totals of all observations.

Returning to the consideration of the experience of the Mutual Life Insurance Company, I will refer to the facts brought out by Mr. McClintock in 1895, showing the results with Abstainers and Non-Abstainers for the 15 years from 1875 to 1889. The available material started with the year 1875 when the Company's application blank first contained the direct question as to the use of alcohol, requiring a definite answer, "Yes" or "No." The experience was based on amount of insurance rather than policies, and the American Table was adopted as the standard for comparison. To eliminate the element of medical selection, 40% of the loss expected by the Standard Table was taken for the first policy year; 70% for the second, third, and fourth policy years and 87.5% for each policy year after the fifth. The maximum expected loss among Abstainers was \$5,455,669, whereas the actual loss was \$4,251,050, a ratio of 77.8%. With the Non-Abstainers the expected was \$9,829,462, and the actual \$9,469,407, a ratio of 96.6%, a difference of 18.8 points in favor of Abstainers.

For further study and comparison, I present Table "D" giving ages at issue and results.

## Porter—Mortality from Alcohol

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TABLE D.

ISSUE OF 1875-1888. EXPOSURE OF 1875-1889.

SUMMARY BY AGES—POLICY YEARS 1-15 BY THE AMERICAN TABLE,  
GRADED.

ABSTAINERS				NON-ABSTAINERS			
Ages	DEATH-CLAIMS		Ratio	DEATH-CLAIMS		Ratio	
	Expected	Actual		Expected	Actual		
Below 20	\$ 14,499	\$ 30,500	210.5	\$ 6,060	\$ 7,500	123.8	
20-29	968,558	708,800	73.0	1,252,186	975,700	78.0	
30-39	1,690,450	1,157,950	68.6	3,179,573	2,705,150	84.9	
40-49	1,410,184	1,038,100	73.6	2,895,750	2,767,775	95.5	
50-59	978,863	996,200	101.6	1,884,391	2,288,100	121.5	
60-69	373,321	315,500	84.6	594,919	694,182	116.6	
Above 69	19,794	4,000	20.2	16,583	31,000	186.9	
15-39	2,673,597	1,897,250	71.1	4,437,819	3,688,350	83.0	
40 & Ov.	2,782,162	2,353,800	84.7	5,391,643	5,781,057	107.5	
Total	\$5,455,669	\$4,251,050	77.8	\$9,829,462	\$9,469,407	96.6	

ISSUE OF 1907-1912. EXPOSURE OF 1907-1913.

SUMMARY BY AGES—POLICY YEARS 1-6. BY THE M. A. TABLE.

## ABSTAINERS.

ON APPLICATIONS					ON AMOUNTS				
Ages	Expos.	DEATHS		Ratio	Exposures	DEATH-CLAIMS		Ratio	
		Act.	Expected			Actual	Expected		
15-19'	9,970	27	38,590	69.9	\$ 12,879,375	\$ 38,500	\$ 49,849	77.4	
20-29	35,251	73	145,205	50.3	56,244,475	135,100	231,075	58.2	
30-39	20,175	45	93,675	48.2	42,108,825	82,400	195,137	42.3	
40-49	10,701	37	74,069	50.0	30,610,100	98,500	211,271	40.7	
50-59	3,908	37	56,418	65.5	10,869,300	101,200	157,135	64.5	
60 & Ov.	659	10	22,383	44.6	1,889,050	18,500	62,554	29.6	
15-39	65,396	145	277,470	52.3	111,232,675	256,000	476,661	53.8	
40 & Ov.	15,268	84	152,870	54.9	43,368,450	218,200	430,960	50.6	
Total	80,664	229	430,340	53.4	\$154,601,125	\$474,200	\$907,621	52.2	

ISSUE OF 1907-1912. EXPOSURE OF 1907-1913.

SUMMARY BY AGES—POLICY YEARS 1-6. BY THE M. A. TABLE.

## NON-ABSTAINERS.

15-19	3,572	14	13,861	101.1	\$ 4,931,950	\$ 17,000	\$ 19,161	88.7
20-29	42,500	98	175,630	55.8	83,482,700	154,300	345,335	44.7
30-39	43,820	127	204,265	62.2	126,330,725	497,000	590,766	84.0
40-49	28,666	137	202,209	67.8	109,340,750	513,000	774,737	66.2
50-59	10,117	105	145,078	72.3	47,669,275	477,900	702,709	67.9
60 & Ov.	1,682	39	58,269	67.1	6,821,425	118,500	223,396	53.1
15-39	89,892	230	393,756	60.7	214,745,375	668,300	955,262	70.2
40 & Ov.	40,465	281	405,556	69.3	163,831,450	1,109,400	1,700,842	65.2
Total	130,357	520	799,312	65.0	\$378,576,825	\$1,777,700	\$2,656,104	66.8

In the earlier period, 1875 to 1888, the Abstainers gave a loss-ratio of 71% for ages 15-39, and 85% for ages 40 and over, a difference of 14% in favor of the younger age group; and the Non-Abstainers gave a loss-ratio of 83% for ages 15-39 and 107% for ages 40 and over, a difference of 24% in favor of the younger group.

In the later period, 1907 to 1912, the Abstainers exhibit a loss-ratio of 53.8% for ages 15-39, and 50.6% for ages 40 and over; and the Non-Abstainers give a loss-ratio of 70.2% for ages 15-39, and 65.2% for ages 40 and over. These ratios are very consistent in the second period for the reason that the proportion of Abstainers that begin drinking above middle age is supposed to be smaller than below middle age. A higher loss-ratio is found, therefore, in the younger group than in the older among Abstainers. The higher ratio among the Non-Abstainers in the younger age group is probably due to the same cause, namely, that the proportion of intemperate that become hard drinkers is larger at the younger than at the older ages. In the earlier period just the contrary is true; the younger age group shows a diminution of 14 points among Abstainers and 24 points among Non-Abstainers as compared with the older age group. This anomaly in the earlier period may be due to two causes: First, the use of the American Table as a standard of comparison instead of the M. A. Table accounts

largely for the difference in the loss-ratio observed between those entering at young and old ages, as the rate of mortality by the American Table is 170% that of the M. A. Table up to age 40; and then the ratio decreases rapidly to age 70, when it is 100.5%; second, the statistics in the earlier period were not homogeneous. They were based upon the total Domestic Business, whereas in the later period, only 5 occupation classes were taken and the Southern States were eliminated. This lack of homogeneity is also responsible for the greater difference of the mortality ratios between Abstainers and Non-Abstainers of the first period, as compared with the second period, there being a difference of 18.8 points in favor of Abstainers in the former and but 14.6 points in the latter, calculated by amounts, and only 11.6 points by applications.

Owing to the technical differences in the experiences quoted and standards followed in calculation, it is impossible to accurately summarize the total results of all of the figures submitted from the various companies, but a general observation excluding the Northwestern, allowing for these differences, furnishes an interesting conclusion. It shows that, roughly, the average mortality ratio among Total Abstainers from alcohol is 68.4%, whereas that of the Non-Abstainer is 91.5%, a difference of 23.1%. This means a reduction of about  $2\frac{1}{2}$  years in the average life of the Non-Abstainer, below that of the Abstainer. Although somewhat less than the period indicated as a result of previous calculations, it is most significant and far-reaching in its importance.

At a time when the attention of the entire world is directed to the question of the effects of alcohol, it is well to have as reliable data as possible from which to form conclusions. I submit, therefore, to this Association, as the representative body dealing with medical statistics, this contribution, trusting that Table "B" may serve, until a larger volume of material is presented, as an accurate scientific standard of the comparative mortality among Abstainers and Non-Abstainers from alcohol.



## DISCUSSION.

Dr. Rogers—I have read this paper with a very great deal of interest. I think that making due allowance in our minds for the comparatively short exposure of this material it is an important contribution to our knowledge of the influence of the use and abstinence from the use of alcohol.

Table C shows a mortality ratio of

53.4% for total abstainers,

64% for temperate users,

72.6% for moderate users.

Now if we assume that all of the material which Dr. Porter has brought together makes up the entire membership of a single Life Insurance Company of rather more than two hundred thousand members, then the eighty thousand total abstainers will show a mortality of about 85% of the mortality of the entire Company; the mortality among the temperate or conservative users will be from 103 to 105%; and the mortality of the moderate users will be from 115 to 117% of the mortality experienced by these lives taken together. In other words, the total abstainers differ on the favorable side of the average by about 15%, and those who use alcohol moderately, about 15% on the unfavorable side. This shows an apparent spread of about 30% of one mortality between those who are total abstainers and those who are rather free users of alcohol, but still not intemperate users. (This I believe would be confirmed if this material were kept longer under observation.)

The method of treatment which I have suggested gives me, at any rate, a better grip of the problem than when the mortalities are expressed in terms of some other mortality table.

One important point in connection with this subject is the mental attitude of the Medical Board at the time these risks were taken and I should like to ask Dr. Porter whether, when these risks were accepted, total abstainers were accepted more freely than others simply because they were total abstainers.

Dr. Porter—I had that point in mind, Dr. Rogers, and in



answering that question I think I can put it in this way, that for the sum total or the average cases taken in large volume there was not that discrimination made. In appeal cases we unquestionably had that point in mind, but I doubt rather that it was a factor in the total number as influencing this result. I know from my own personal experience that it was not.

Dr. Rogers—And your Medical Board, Dr. Porter, did not as a deliberate policy of selection take into account total abstinence?

Dr. Porter—That factor would not be in the rank and file; but unquestionably it was in the appeal cases and in selected cases.

Dr. Rogers—With reference to the statistics published recently by Mr. Phelps, covering the experience of the Northwestern, I should like to ask Dr. Fisher whether, during the period covered by these statistics, the Northwestern in its selection was taking into account as a favorable factor the fact that certain of these risks were total abstainers.

Dr. Fisher—Decidedly so.

Dr. Rogers—Here then we have two types of selection with reference to the use of alcohol, the type of the Northwestern in which, given a total abstainer the other factors in the case were more liberally treated, and the type of the Mutual Life where the fact that a man was a total abstainer was not specially taken into account. It strikes me that the difference between the experience of the Mutual Life and the experience of the Northwestern may be easily explained by the difference in mental attitude of the two Medical Boards, in other words, the difference in the results obtained by the two Companies may easily be simply a question of selection. If, for example, we have in any case a peculiarly favorable factor, and if we allow our medical selection with respect to all other factors to be rather more liberal, our greater liberality of treatment of these latter factors will go far to offset the favorable factor referred to. On the other hand, if we disregard the very favorable factor and select rigidly with respect to all others,

we shall secure a lower mortality. The Northwestern, by making allowance for the factor of total abstinence and selecting more liberally in all other respects, was sure to obtain a higher aggregate mortality among its total abstainers, and the Mutual Life by disregarding the factor of total abstinence was bound to secure a relatively better mortality. Dr. Dwight in his very admirable paper deals with exactly the same point. It lies at the very bottom of the question of the interpretation that we shall ultimately put on the Medico-Actuarial Investigation; indeed, it lies at the bottom of our interpretation of all life insurance statistics—the mental attitude of the people who make the selection.

Dr. McMahon—Mr. President and Gentlemen: What is the object of our discussion of the subject under consideration? Is it not that we may give and receive light on the value of total abstinence from alcoholic beverages as a factor in prolonging the average lifetime of insured lives?

It is not a question with the Life Companies which classify their risks as abstainers and non-abstainers whether or not the moderate use of alcoholic beverages, if adhered to throughout life, tends to or does shorten life. The question is, are conditions such that a large class of men who are total abstainers when they insure, and the full validity of whose insurance depends on their always remaining so, can be relied upon to experience a lower average of mortality than a similar class of men made up largely, if not mainly, of those who at the time of insuring admit the use of alcoholic beverages in moderation.

If it is true that men who are total abstainers and consistently remain total abstainers show a lower average mortality than those who cannot be so classed, it must be true that they are more desirable risks for a company at the same premium rates and equally desirable at even lower rates when insurances without profits are granted and that they should, at least, have separate classification under with-profits policies, in order that they may get the important advantage of their more favorable mortality.

The furthest that any writer, who is opposed to our views and whose productions I have read, goes is to attempt to discredit the claim that total abstainers are better risks for Life Insurance than non-abstainers by setting up the claim that it has not been satisfactorily proven to him that those who remain strictly moderate users of alcoholic beverages show a higher mortality than those who are strictly total abstainers. Whether this be the case or not is a matter which does not concern those of us who advocate the separate classification of risks as abstainers and non-abstainers not only at the time of acceptance but subsequently by eliminating those who do not continue to be total abstainers from the abstainers' section. Unless this is done we cannot make a fair comparison between the lives of abstainers and non-abstainers. Any comparison that does not draw the line rigidly between those who remain consistent total abstainers and those who are not abstainers does not accomplish the purpose. No man who knows anything worth while about the matter will dispute the statement that the immoderate use of alcoholic beverages seriously impairs vitality and shortens the average life of its victims.

Immoderate drinkers practically always come from the ranks of the moderate drinkers. Total abstainers at entry comparatively seldom become immoderate drinkers later in life. On the other hand it is true too that a large percentage of those who are really moderate drinkers at the time of insuring gradually drift into habits of immoderation as time goes along. It is therefore a fact which will be generally admitted that no selection of a large number of lives of moderate drinkers can be so carefully made for life insurance that a large percentage of those constituting it will not sometime cease to be moderate drinkers and thus cause deterioration in the average character and quality of the business. If these facts be admitted and I think, speaking generally, they are, then the evidence of experience furnished by the companies making and maintaining a separate classification of their risks is exactly what was to be expected and such as is likely to be

realized in future experience when risks are kept distinctly separate in the two classes. It will be found that in the experience of every company that has done any considerable amount of business and has maintained a distinctly separate classification of its risks for any considerable time there has always and in every case been a marked difference in mortality in favor of the abstainers.

I believe that the following summarized figures taken from the actual experience of the companies mentioned is reliable.

In an experience of forty-nine years, from 1866 to 1914 inclusive, The United Kingdom Temperance and General Provident Institution invariably had a lower mortality in every year in its abstainers' section than in its general section. During all that period its average mortality was as to number of risks 69.32% of the expectation in its abstainers' section and 91.72% in its general section. As to amount of risk its average loss ratio was 65.22% of expectation in its abstainers' section and 89.16% in its general section.

The following table shows the exact facts of its experience:  
TEMPERANCE AND GENERAL PROVIDENT INSTITUTION.

EXPERIENCE 49 YEARS, 1866 TO 1914 INCLUSIVE.

£1. = \$4.86

ITEM	SECTION		Whole Business
	Temperance	General	
Expected death losses	\$19,378,594	\$21,770,948	\$41,149,542
Actual death losses	12,638,790	19,412,444	32,051,234
Mortality savings	6,739,804	2,358,504	9,198,308
Ratio of actual to expected losses	65.22%	89.16%	77.70%
Ratio of savings to expected losses	34.78%	10.84%	22.30%

WITH ALL BUSINESS ON LOSS BASIS OF GENERAL SECTION

Death losses would have been	\$17,277,954	\$19,412,444	\$36,690,398
Mortality savings would have been	2,100,640	2,358,504	4,459,144
Mortality savings would have been less by	4,739,164		4,739,164

Total losses would have been 14.45% higher than they were.

Total mortality savings would have been only 48.48% of what they were.

## WITH ALL BUSINESS ON LOSS BASIS OF TEMPERANCE SECTION

Death losses would have been	\$12,638,790	\$14,199,012	\$26,837,802
Mortality savings would have been	6,839,804	7,571,936	14,411,740
Mortality savings would have been more by		5,213,432	5,213,432

Total death losses would have been 16.27% less than they were

Total mortality savings would have been 56.67% more than they were  
—an advantage of \$5,213,432.

In an experience of thirty-one years, 1884 to 1914 inclusive, The Sceptre Life Association experienced an average mortality of 50.99% of the expectation in its abstainers' section and 79.04% of the expectation in its general section. Its mortality was invariably higher and averaged for thirty-one years 55% higher in its general than in its abstainers' section.

In an experience of thirty years, 1883 to 1912 inclusive, The Scottish Temperance Life experienced an average mortality of 46% of the expectation in its abstainers' section and 66% in its general section. Its mortality was invariably higher and averaged for thirty years 43% higher in its General than its abstainers' section.

In the last thirteen years of its long experience for which reports are available (1901 to 1913 inclusive), The Australian Temperance and General Mutual Life had an average mortality of 47.1% of the expectation in its abstainers' section and 73.9% of the expectation in its general section. Its mortality averaged 57% higher in its general than in its temperance section.

In the last thirteen years (1902 to 1914) of twenty-nine years of experience, the business of the Manufacturers Life Insurance Company shows an average mortality of 38.9% of the expectation in its abstainers' section and 66.8% of the expectation in its general section. Mortality in its general section averaged 71.7% higher than in its abstainers section.

The Abstainers and General Insurance Company in an experience of thirty-one years from 1884 to 1914 inclusive

had an average mortality in its abstainers' section of only 42.9% of the expectation.

The Dominion Life in an experience of twenty-six years 1889 to 1914 had an average mortality in its abstainers' section of only 34% of expectation.

In an experience of eleven years (1904 to 1914), The Equity Life of Canada had an average loss ratio in its abstainers' section of only 21.7% of the expectation. It is true that we had only 9,700 years of life under observation in our abstainers' section and would not therefore be warranted in drawing any deductions therefrom were it not that our experience has been exactly in line with that of every other company that classifies its risks separately and differs only in the fact that it is, so far as I can learn, the most favorable mortality experience recorded by any company during the same period of its history.

Where no penalty attaches for misstatement of fact at the outset as to habits or subsequent change of habits, and no effort is made or could be successfully made to maintain classification of risks with regard to actual use or non-use of alcoholic beverages, it is unreasonable to look for the same excellent results amongst those classed as abstainers as would be expected in companies where rigid classification is made at the outset and maintained throughout the life of the insurance.

The published experience of the companies which have made an investigation of their business based upon the statements of applicants at the time of insuring could not be expected to do more than to confirm in a general way the experience of companies which make and maintain a rigid classification of their risks. All evidence derived from such investigations as it is possible to make and from such as have been made by the Mutual Life and other companies indicates in a remarkable degree what would have been the results had the companies contributing their experience followed the course adopted and adhered to by the companies that maintain a strict classification of their risks.

The case for total abstainers would be complete and beyond

controversy if it could be shown that the abstainers and non-abstainers in those companies which maintain a separate classification were drawn from exactly the similar elements in the community. If, for instance, we could make a comparison between a very large number of lives of farmers, clergymen, and teachers who were total abstainers, with a similar number of farmers, clergymen, and teachers who were non-abstainers, it would be possible to say how much of the lower mortality of total abstainers is to be credited to abstinence from alcohol and how much to occupation and environment.

That abstainers are better risks than non-abstainers is, I maintain, conclusively proven. Those who claim that this is due to other causes than abstinence from alcoholic beverages have not brought forward evidence to support their claims. My own belief is that abstainers are on the whole drawn from a more desirable element from an insurance standpoint, but making all allowances for this the abstinence from alcohol is the determining factor. The excessive drinkers are recruited from the moderate drinkers and we would therefore expect to get better results from the abstainers. The results recorded are in keeping with this expectation and the onus of proof is on those who offer other explanations.

Dr. Edwin W. Dwight then read a paper entitled:

SUGGESTIONS AS TO THE METHODS TO BE FOLLOWED IN UTILIZING THE MATERIAL CONTAINED IN THE REPORT OF THE MEDICO-ACTUARIAL COMMITTEE.

BY EDWIN WELLES DWIGHT, M.D.,

*Medical Director, New England Mutual Life Insurance Company.*

Mr. President and Gentlemen: It is with a good deal of trepidation that I begin the reading of this paper. I ap-



preciate thoroughly that its purpose is simply to open a discussion. I appreciate that it covers a very small portion of the subject which has been assigned to me, that any one of us might continue indefinitely along the same or exactly opposite lines. I appreciated when I undertook the contract that I should be subject to discussion. I do not ask for any consideration. The more you differ with me the more you will be impressed with the magnitude of the subject. I simply want to have the jury appreciate that this paper was not written for Actuaries, neither was it written entirely for Medical Directors. The value of the work which the Medico-Actuarial Committee has done will, I think, depend very largely upon the attitude of the Executive Officers, particularly in the smaller companies, and in writing this paper, and in bringing it to your attention, I have had perhaps more in my mind the effect upon the Executive Officers, and upon those who in the final analysis have to pass upon the judgment of the Medical Directors, than I had its effect upon either Mr. Rhodes or Mr. Hunter or those members of the Association who are more familiar with statistical work.

During the past seven or eight years it has been my privilege to be associated with the work of the Medico-Actuarial Committee. My personal contribution to the detailed results has been comparatively small, but the work has been well worth doing and on account of the extremely efficient and self-sacrificing efforts of certain members of the Committee, it has been well done.

As a result of the Committee's labors there has been furnished to the public, as well as to the contributing companies, an instrument of precision the value of which will depend largely upon the way it is used.

The ownership of a large and valuable assortment of tools does not make a good mechanic. The individual who has the largest library is not necessarily the best read. The placing of this really valuable information in the hands of our companies will be of very little service if there does not go with it,



or find awaiting it, a thorough appreciation of its value as well as of its limitations.

This work of your Committee will not revolutionize medical selection neither will it enable the Agency Inspector or the Cashier to pass intelligently, or automatically, upon the acceptance of risks. If properly used and appreciated it will, however, enable your Actuary and Medical Director to meet on common ground. It will help the Actuary to appreciate the value of homogeneity and the Medical Director the value of facts. It will furnish ammunition to the Agency Department and, as impressions and guess work are eliminated from the work of these three departments they will grow nearer together; each standing with at least one foot on the common ground of fact.

If, as a result of this work, we could go no farther a great deal of good would have been accomplished, but we can go farther. As a matter of fact we have but started along the right path. There is no company which has not gained by this investigation. Each of our companies has, I believe, received full value for its expenditure of time and money. Just how much any one of us will gain will depend upon ourselves. If we are satisfied with having developed a valuable tool we have at least done something, but if we now learn how it may be used to the best advantage and accustom ourselves and our associates to its use we shall go far and keep going. I have no idea of attempting to describe in detail the best way to use this information for there is no one best way. The method which is most useful to me may be of little service to you. There are, however, a number of fundamentals and without an appreciation of them this information becomes of little value.

These statistics have the advantage of being honest, accurate, and published with no intent to defraud or unduly influence those who may be guided by them and yet the mortalities arrived at do not accurately represent the general mortality of the classes under discussion and if taken at their face value are almost sure to result in a false idea of the situation.

There are four facts which should be constantly kept in mind:

1st. These statistics are taken from groups of selected lives and the results are modified by that selection.

The mortality of any group after selection will naturally be smaller than that of an unselected group as it applies for insurance. The extent of this reduction will depend upon the prevalent idea of the danger associated with it. For this reason when our results show a less mortality than would naturally be expected the question of over selection should be raised. On the other hand, a group which has been freely taken by all companies may show a much higher relative mortality than had the dangers of the group been generally appreciated.

2d. As the method of selection has varied the classes are made up from heterogeneous material and it should be remembered that the mortalities presented depend upon the average selection of all of the contributing companies.

3d. The classes are not always, or usually, homogeneous in themselves. Comparatively few of these classes as studied in this investigation have been so thoroughly sifted as to eliminate all impairments aside from the one which is being tested. Experience with these classes, and with similar investigations, satisfies me that the mortality in many of them has been very materially influenced by the number of impairments involved.

4th. The statistics presented in this investigation are based upon ages at entry as affected by insurance years so that the results obtained may be quite different than if, as has been the case with a number of other investigations, they had been based upon attained ages. This is particularly true of groups which would otherwise show a high mortality in late life.

For these reasons, among others, the mortalities developed by this investigation do not as a rule represent the mortality which a given company will have reason to expect from an unselected class as it appears for insurance and if we are to

apply the information furnished, in an intelligent way, to our daily work these facts must be constantly kept in mind.

The mortality which we may expect in our own company will depend upon the methods and severity of our own selection. If our selection in the future fairly represents the average selection of the contributing companies during the period covered by this investigation we may reasonably expect similar results.

The working value of these statistics will be very greatly increased, I might almost say that a value will be created when we are able to compare the results of our own selection with the results obtained from the selection of the contributing companies. We know our own methods of selection. If we are able to compare the results of those methods with those obtained by the average method we may arrive at a just and fair conclusion; otherwise we are again involved in the meshes of impressions and guess work.

While, I think, it is clear that the gross mortalities as developed by the investigation cannot be accepted at their face value without serious consideration, the statistics furnished will, even upon superficial study, demonstrate most clearly and accurately the trend of mortality and what may be expected in classes of selected risks under average conditions.

To my mind the trend of mortalities is much more important than is the gross mortality of any given group. Especially is this true in those groups which are not of known, reliable, and homogeneous origin.

In translating the findings of the Medico-Actuarial investigation into a common language which will be readily understood by those to whom it may be of interest and value, it is important to appreciate that a new table has been developed and used to measure the results. Of course we all appreciate that the table used is of little importance and does not influence the actual death rate but the average man is apt to think of mortalities in terms of the American Experience Table. While the creation of an M. A. table is unquestionably of scientific interest I doubt very much if the practical value of

our findings, to the general insurance world, has been increased by measuring our results with an unfamiliar instrument. The mortality table is a measuring rod, nothing less and nothing more, but there are certain advantages to be gained by simplicity and the use of terms with which our audience is familiar. It is, however, not difficult to translate the M. A. table into any other language which we may decide to use in measuring our results.

While the relation of the M. A. table to the American varies at different ages, it is probable that at all ages taken together 150% of the M. A. may be considered as representing the American, at least that is near enough for our purpose in the present discussion.

In order to obtain a simple and clear picture of the trend of mortalities in any group or a number of groups diagrams are more effective, to the average man, than columns of figures, and in carrying out the purposes of this paper I have included six charts in the form we are using at our Home Office, three of these charts representing the M. A. findings in forty-five classes which naturally fall into three groups. They include all classes which have to do with a family history of tuberculosis, those individuals whose abdominal girth was greater than the chest expanded, and those occupations connected with the liquor trade. With each of these three charts I am showing another which gives the experience of the New England Mutual Life Insurance Company with a group of somewhat similar risks.

The charts which we are comparing vary in their origin, their subdivisions, and their methods of handling. The M. A. charts are treated with the M. A. table, are subdivided along entirely different lines and based upon ages at entry modified by insurance years. The New England Mutual charts represent actual deaths per thousand exposures, are compared with the American table, and our own general experience and are based upon attained ages. These charts then represent classes which differ radically in their selection, origin, and method of treatment. They differ in almost every way except

that the same general impairment runs through each pair and for that very reason they are particularly valuable as demonstrating the trend of mortality which may be expected with each impairment and from a study of them a great deal may be learned as to the individual classes which are represented by these various subdivisions.

Taking first the chart showing the M. A. experience with a family history of tuberculosis, made up of sixteen classes divided by the number of cases of tuberculosis and the relative height and weight.

Even a most casual glance shows a typical and obvious trend of mortality which could be hardly overlooked when presented in this way.

With one exception all of the classes show a high early life mortality and that exception occurs in a class of excessive heavy weights. They all cross the American experience line before age 35 and all but three have passed the M. A. average before age 45. Two of these exceptions are classes of heavy weights and the other one of excessive light weight which crosses within the next few years.

All of these sixteen classes show a good mortality in late life except in three instances, all of which are heavy weight groups which show the typical late life mortality associated with heavy weights.

It will also be noted that the extent of the mortalities in early life is in direct proportion to the degree of light weight.

There are a number of finer points which will appear on more careful study, but certain facts are obvious.

1st. We have sixteen classes having one impairment in common and two others which vary with the different classes. A family history of tuberculosis, the light weight and heavy weight subdivisions.

The chart presents the characteristic mortality curves of all these three. The early life mortality of the first two being increased by their combination while the late mortality of the heavy weights is not materially improved by the presence of tuberculosis in the family history.

2d. It is evident that the contributing companies as a whole have not appreciated, to its full extent, the importance of a family history of tuberculosis in the younger applicants especially when combined with light weight; and as there is no good reason to believe that a family history of tuberculosis is a benefit at any time, it is fair to assume that there has been something of over selection in later life.

3d. It seems also clear that the heavy weight should be charged with a certain amount of extra hazard in early life on account of the family history together with a full hazard of this physique in later life.

The chart of the New England is based upon three classes in an attempt to get at the probability of exposure. It is treated in actual deaths per thousand and at attained ages. Here we have the same poor early life and good late life mortalities increased with the probability of exposure. All crossing the American experience before age 35 and the experience of the New England Mutual about age 45.

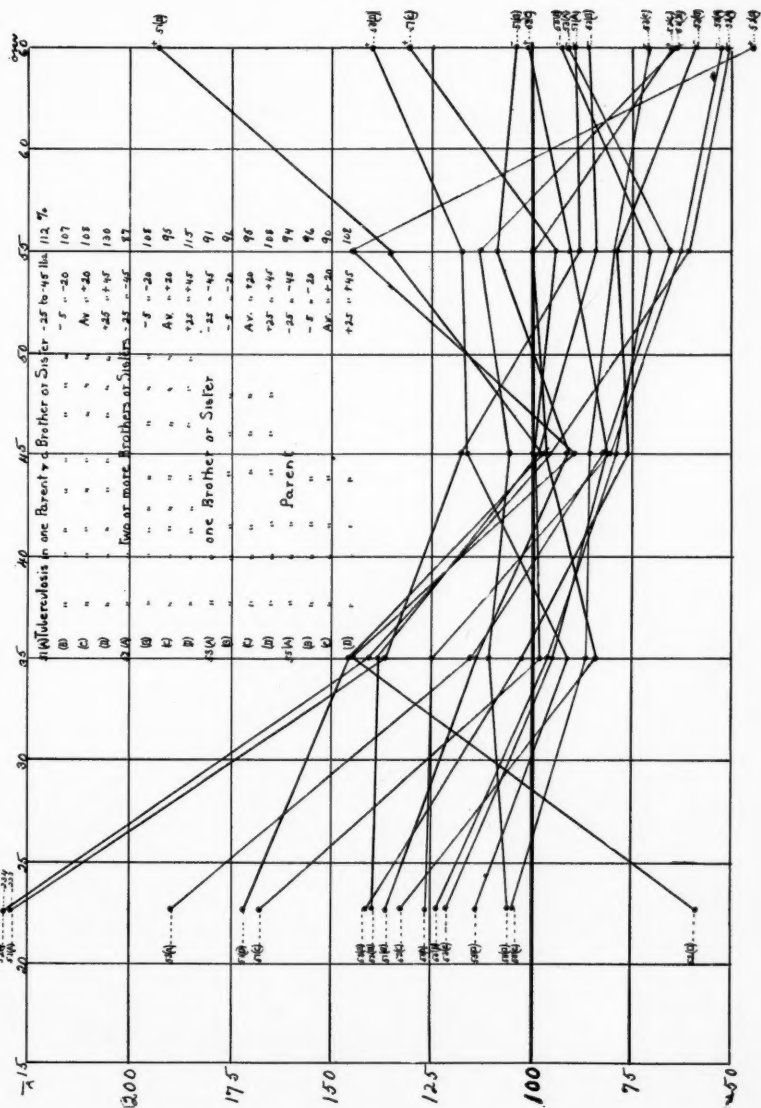
It would seem clear from these charts that in the past we have not selected with sufficient care the younger applicants who present a family history of tuberculosis, but that the failure has not been a serious one except in those of extreme light weight and in those with at least the probability of exposure.

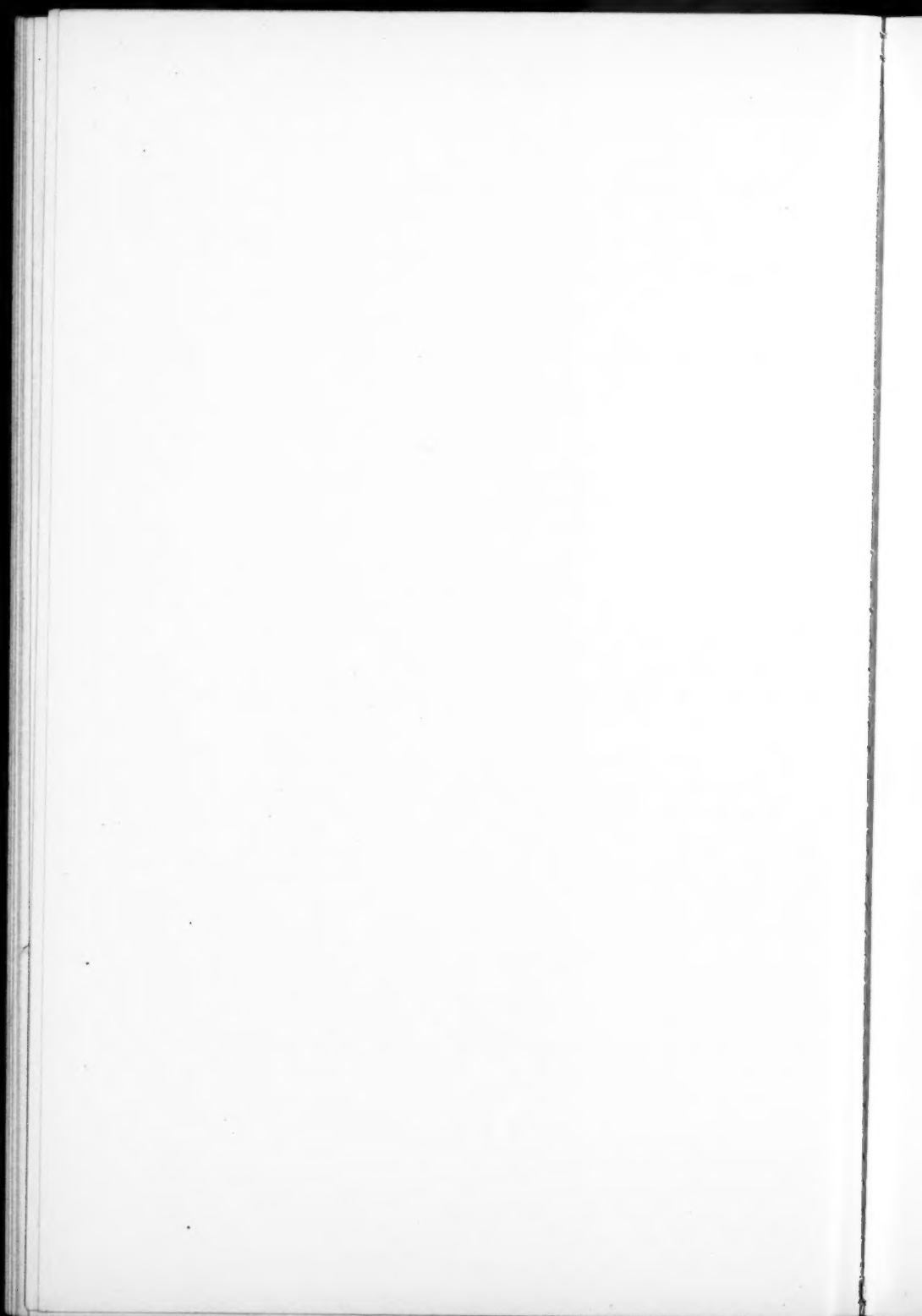
It would also appear that if more care were exercised along these lines our results would be satisfactory and that by giving a little more latitude in later life, with normal weights and without exposure, we should be able to satisfactorily control mortalities in these groups without increasing our percentage of declinations.

The second M. A. chart includes sixteen classes of individuals whose abdominal girth was found to be greater than the chest expanded.

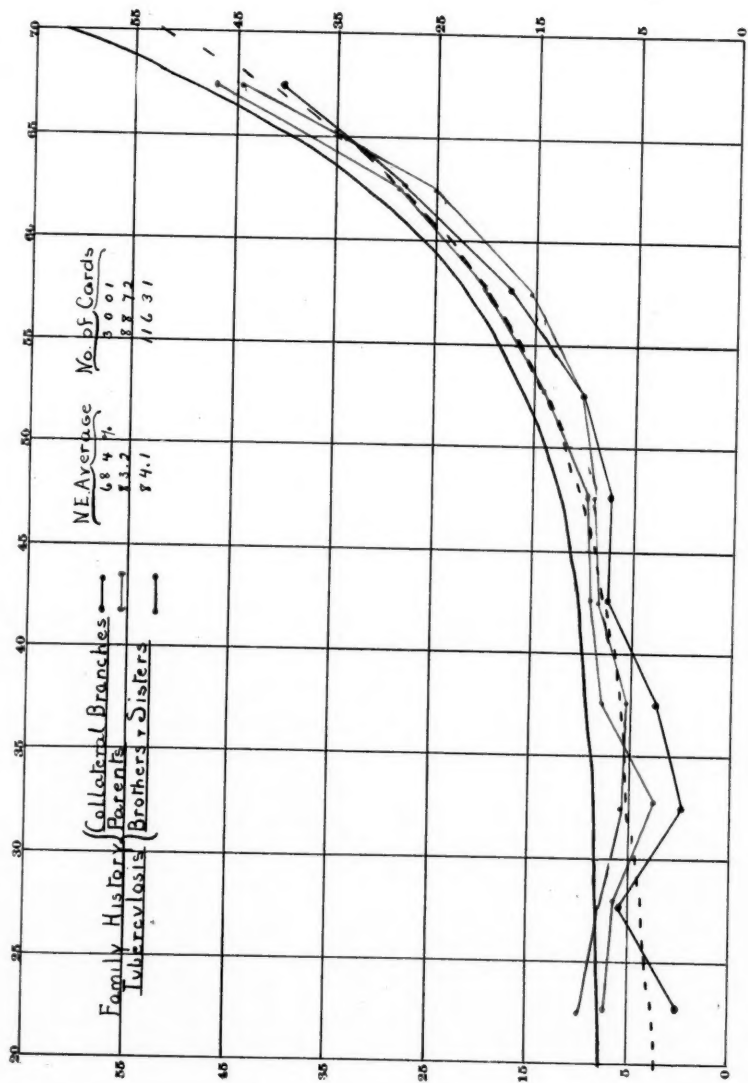
The trend of mortality is evident. All the classes are good in early life, all are worse than the M. A. after age 35 and half are beyond the American table after age 40. The mortality in these classes shows an apparent improvement in later life,

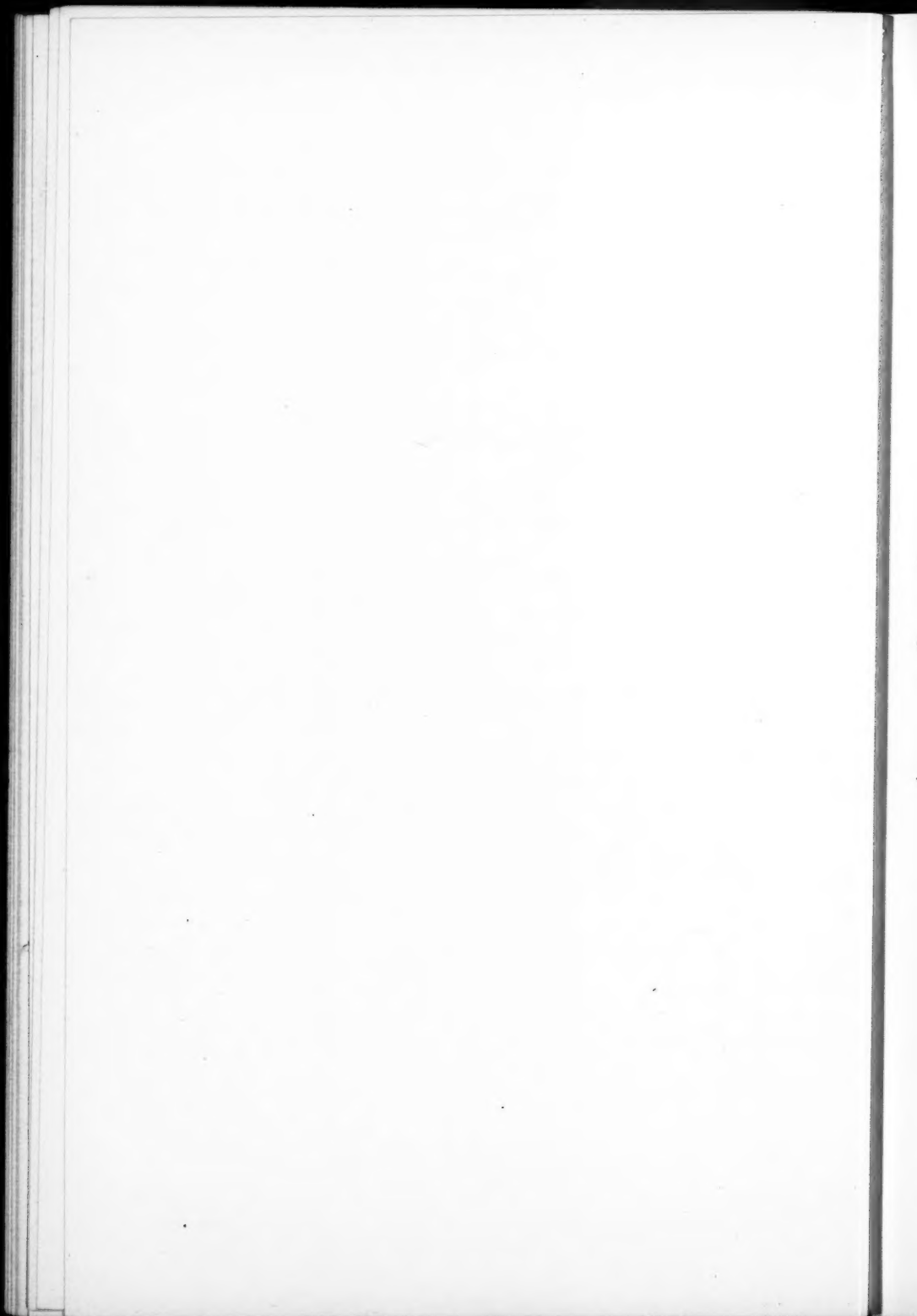
## Family History of Tuberculosis







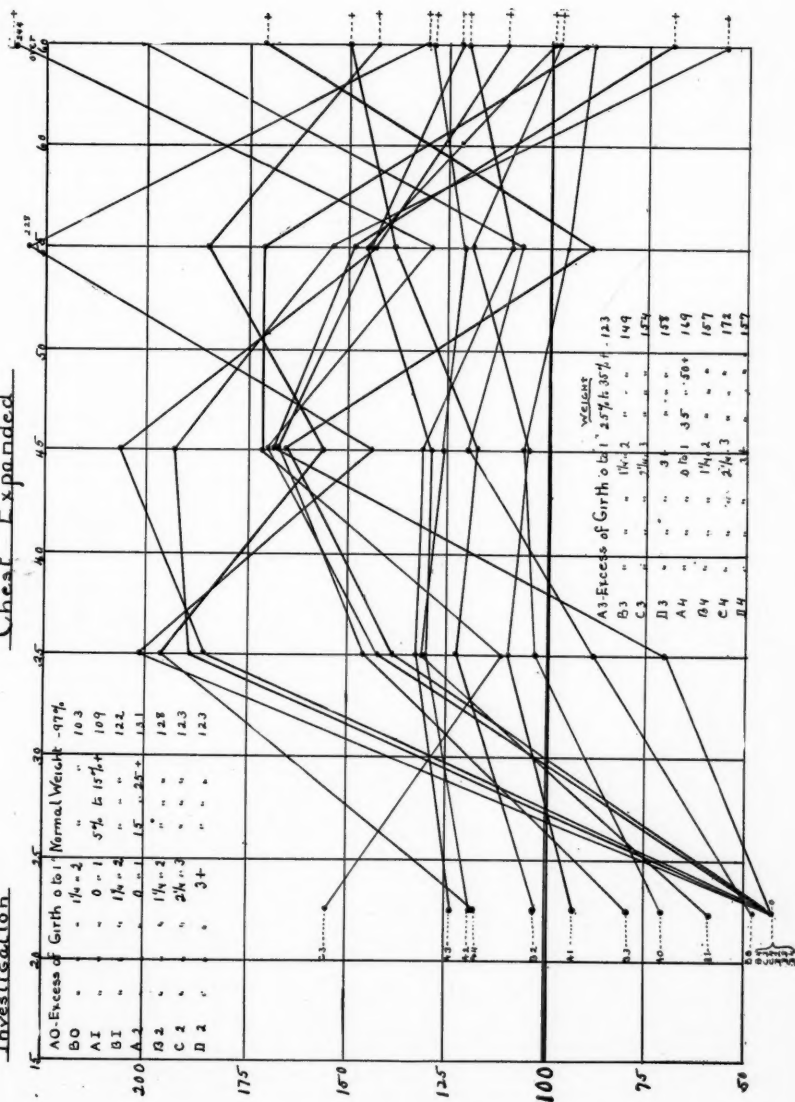


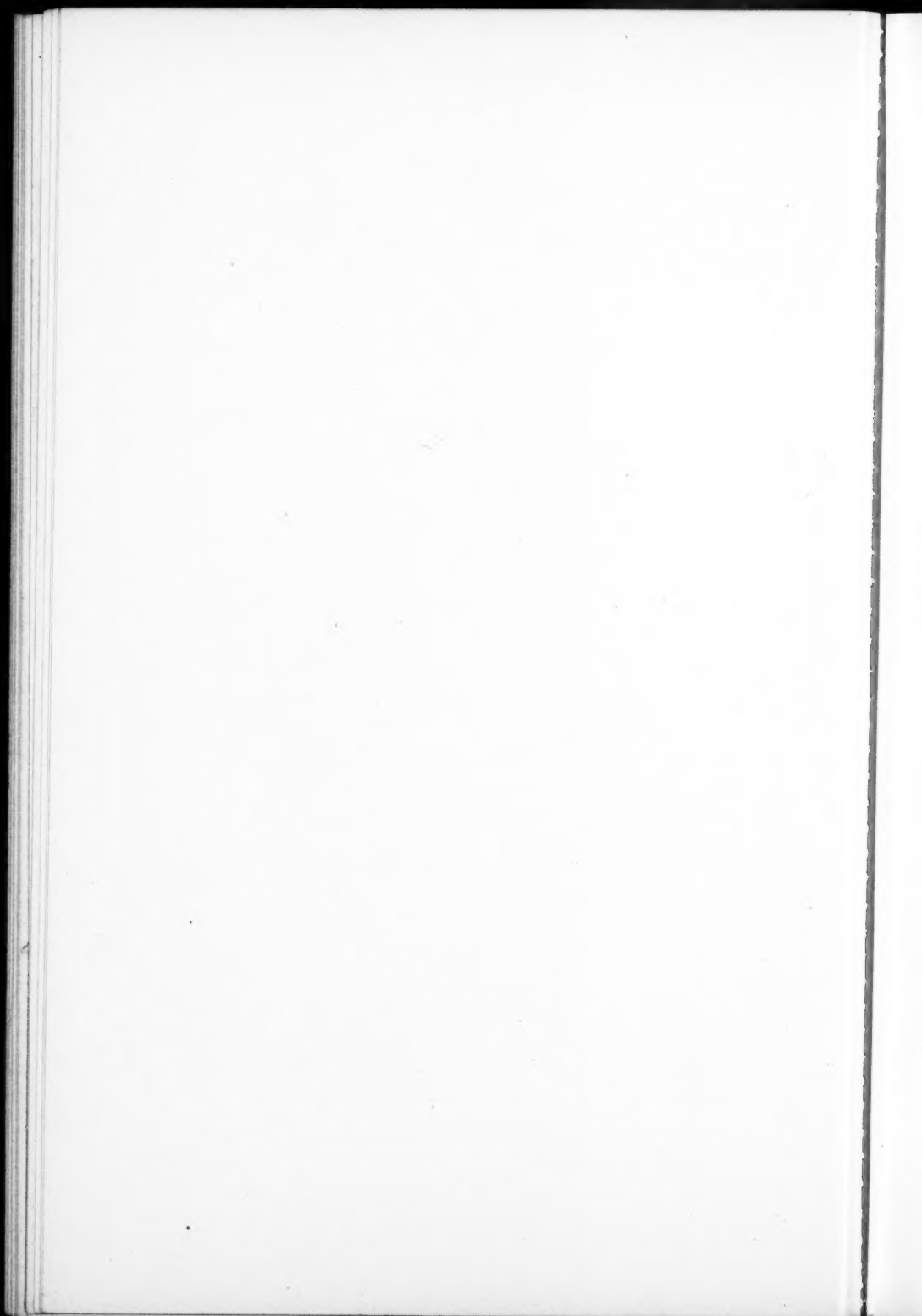


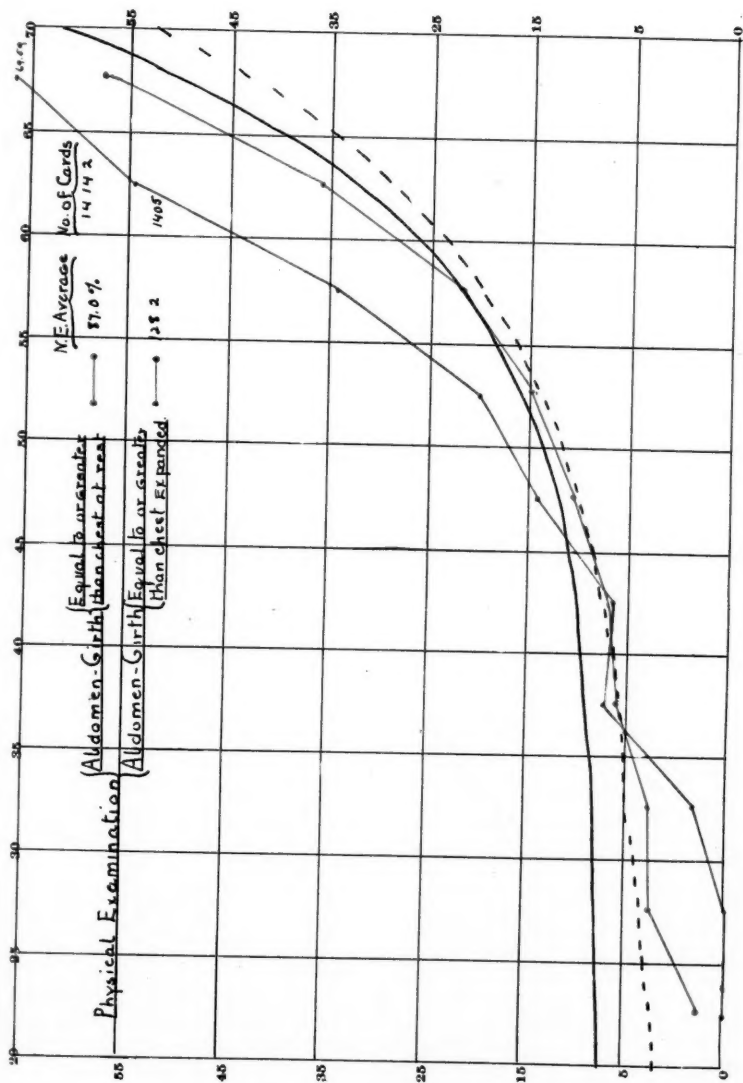
Medico-Actuarial  
Mortality  
Investigation

Abdominal Girth Greater than

Chest Expanded

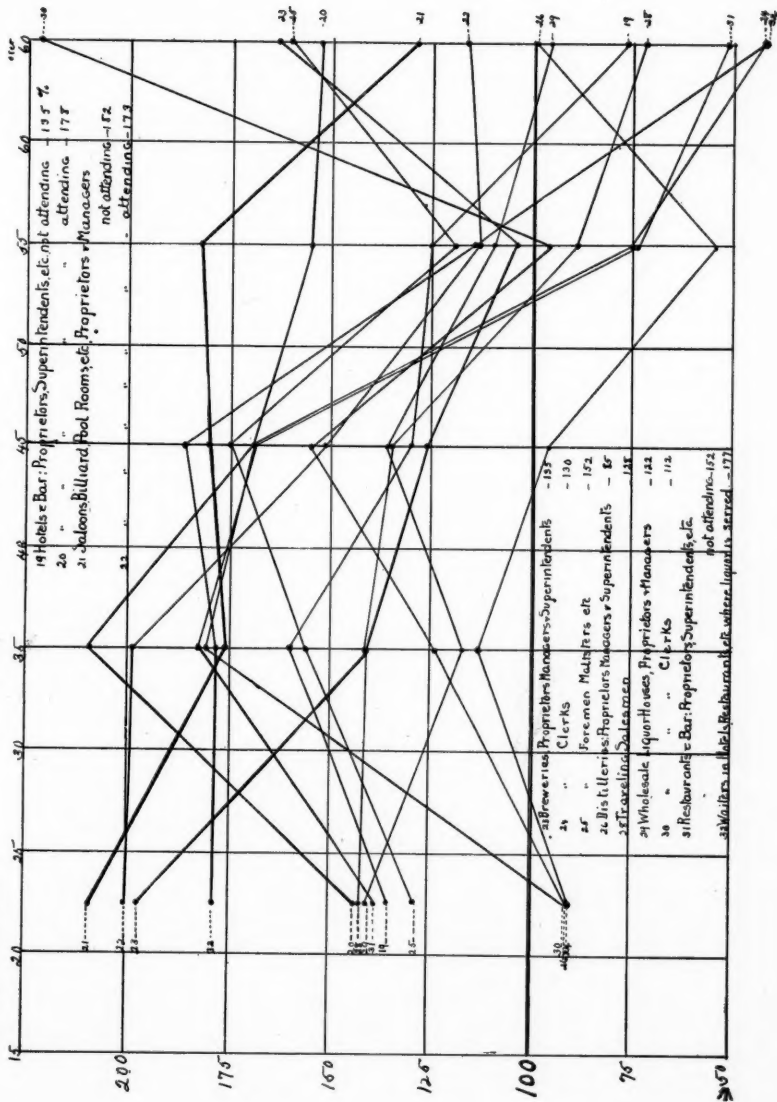


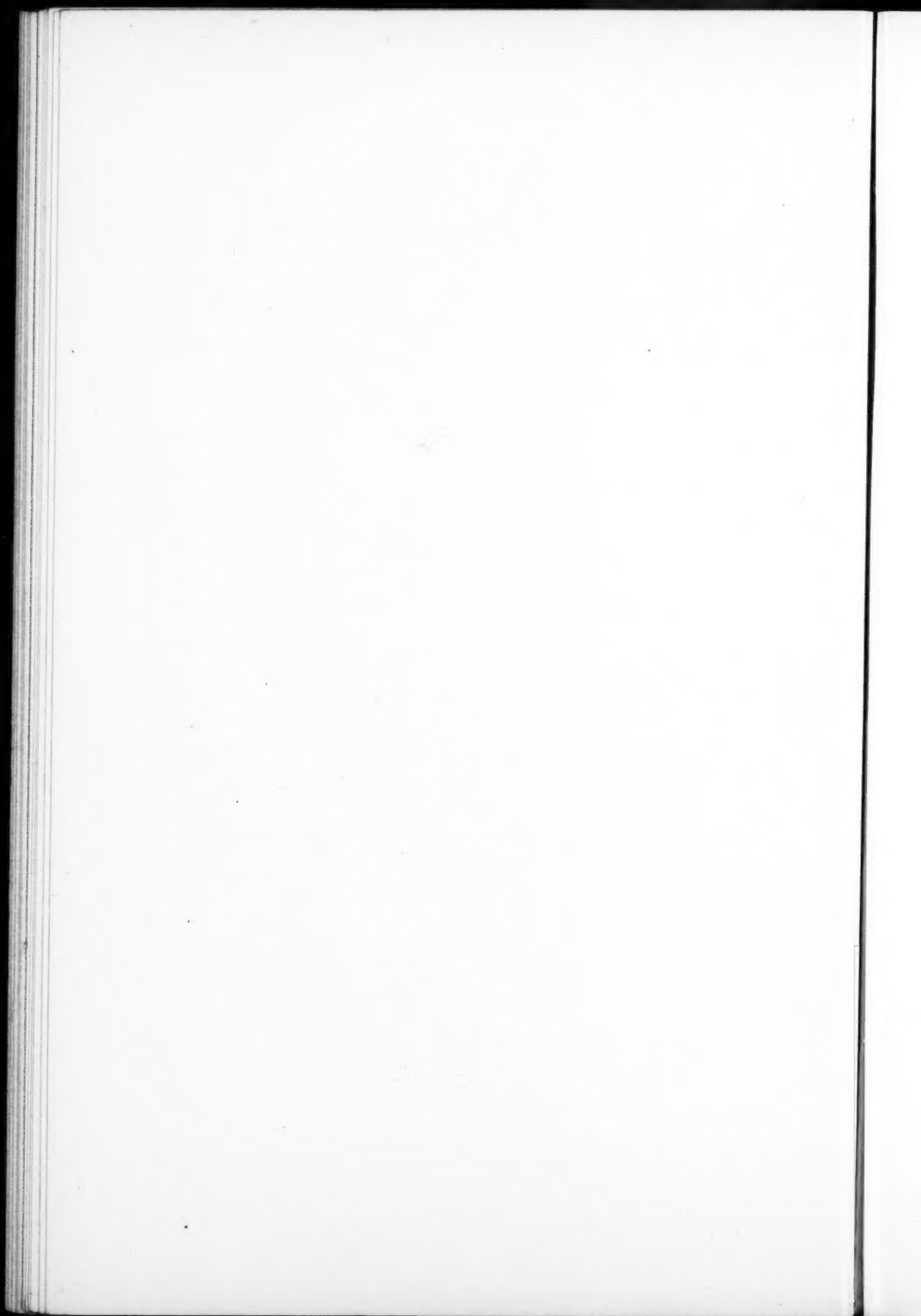




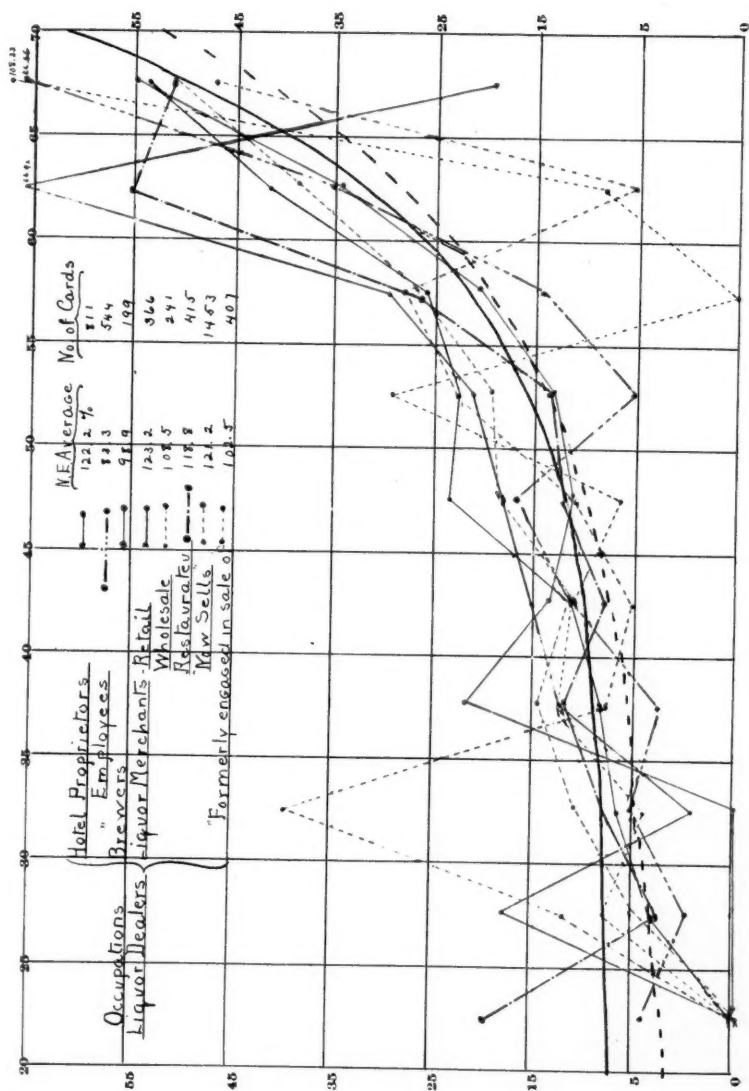
Medico-Archival    All Occupations    having to do with

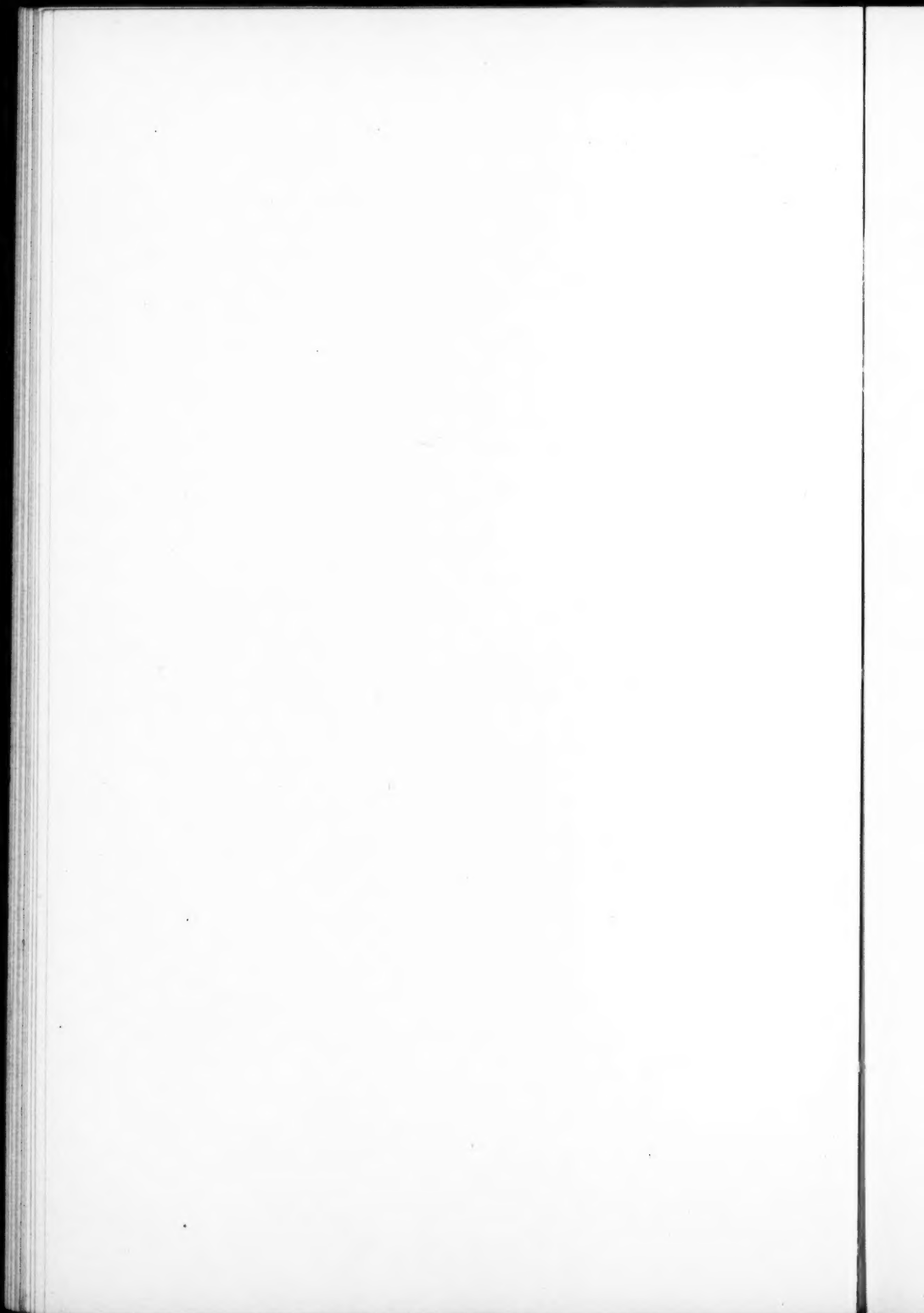
### Medico-Actuarial Mortality Investigation











which, as it does not appear in the New England chart, may be considered as being due to the fact that the M. A. classes are taken at ages at entrance. The New England chart shows two classes good in early life, crossing the average at age 35 and the American, one at age 45 and the other at 55; without the drop in later life noted in the M. A. results.

From these two charts it is apparent that these classes have not been selected with the care which their mortalities would justify, that the mortality hazard is distinctly one of late life and that if we are to have satisfactory results in the future they must be selected with much greater care or policies must be limited to early life.

The third M. A. chart shows thirteen classes which, in one way or another, are related to the liquor business. With but one exception, distillers, all show a high mortality at all ages, generally lower in later life. This trend is not present in the New England chart and I believe it to be due to the fact that they were selected in later life at an age when at least some dangers of the occupation had passed or might be discounted.

The New England chart with eight similar classes shows the same high mortality at all ages without the improvement in later life. These two charts clearly demonstrate that the danger of these occupations has not been appreciated, and that if taken in the future they must be considered extra hazardous and selected with much greater care.

A study of these charts, with the facts and suggestions brought out by them, might well be almost indefinitely extended. Time will not allow of such a study here but I think you will agree that their simple presentation is suggestive and that the most casual investigation demonstrates that we have still something to learn as to the proper treatment of these classes.

These results of the M. A. investigation will be very helpful if they are carefully and understandingly studied, but we will never be able to arrange for an accurate and proper handling of these problems, without we have a definite knowledge of

the results which our own companies have achieved on similar groups handled as we personally have handled them.

I have purposely chosen groups upon which we and our predecessors have spent much time and thought and against the hazard of which we have each believed that our company had been protected. Certainly the New England had confidence in our own methods until, at an expenditure of a good deal of time and effort, it had worked out its own mortality. Then we learned some of our own mistakes, and I confess that we were not very much surprised or disturbed to find that others had erred in the same way.

No one of us has had the experience which would justify his appointment as Medical Director without acquiring some very definite ideas and impressions as to the dangers associated with these various groups. While ideas and impressions are not facts, they are frequently accurate and we all know that the impressions of insurance officials have been sufficiently accurate to enable their companies to keep within the bounds of a safe mortality.

The gross average mortalities of the companies represented in this gathering are without question satisfactory.

I believe that there is probably no member of this association who would not be able to formulate rules which would enable his company to keep its mortality within ten points of any percentage of the American table which would be satisfactory to his Executive Officers. In other words, I believe that there is no member of our Association who would not be able to control the mortality of his company with safety, but the men who can accomplish that safety, and do it economically are much rarer and the Medical Director, who can control the mortality of his company with the greatest possible economy has not as yet been developed.

Economy is not limited to the saving of money. Equally important are the saving of time, effort, friction, and waste and perhaps the greatest economy of all is that which reduces waste to its smallest proportion.

Every declination is a waste of time, effort, and money and a

waste that it multiplied in so far as it affects each department of the company.

That Medical Director is the best who enables his Executive Officers to control mortality with the least proportion of declinations and at a reasonable expense.

A good man with poor tools can accomplish more than a poor man with poor tools, but a good man with good tools can accomplish much more and much better work than either.

The greatest result of the Medico-Actuarial investigation, as I see it, is to place in the hands of all of our companies a well-made, accurate implement which, when intelligently used, will serve to point out many ways in which our service may be improved and waste may be avoided.

This value is almost entirely suggestive and if its results cannot be compared with those which we have accomplished by our own method of selection it is also largely a negative one. A positive value is created when we are able to use the statistics furnished by the Medico-Actuarial investigation as a control for those developed by a thorough investigation of the experience of our own company.

A man who employs high-class skilled mechanics at a high wage and expects them to work with poor tools, or no tools, and yet produce good results economically, is short-sighted; but certainly no more so than is the Life Insurance Company which expects a reasonable mortality effectively and economically furnished by a method of selection based upon impressions and guess work.

#### DISCUSSION.

Dr. Symonds—I think we all owe a debt of gratitude to Dr. Dwight for his paper. It is not one that calls for criticism but only for regret that there was not enough of it, that we could not get a few dozen more classes and go through them in the same way. The association that Dr. Dwight and I have had in the Medico-Actuarial Committee for the past six or seven years has been very pleasant, and I think that we

have both appreciated highly the work which the Actuaries and our associates have done on that Committee. Certainly he has done a great deal—I looked on with a great deal of interest.

There is one thing I would like to say to supplement his paper, and that is that I think it is a good plan to read the text of the Medico-Actuarial report as well as to study the tables. The Committee wrote that text with a great deal of care, sometimes with a great deal of difference as to style. You will notice the entire absence of the present principle—that is due to Dr. Rogers—but the Committee as a whole studied with a great deal of care, and wrote the text in order to draw attention to pitfalls which anybody would be apt to fall into, not knowing the way in which the material had been collected and the way in which it had been prepared, and I should say that one of the fundamentals in the use of the Medico-Actuarial Report is to study the text, not merely the text of the few lines that go with the report of each table, but also the preliminary text showing exactly the conditions under which the material as a whole was gathered and utilized.

With regard to the medical impairment classes, each one of these classes that is reported contained only one medical impairment. Furthermore the doubtful and hazardous occupations were excluded—those occupations which were included in the required and optional classes. On the other hand, the factors of physique, longevity in the family, history, and habitat were ignored, except that the physique was considered in the study of tuberculous family history, and the habitat was considered in the study of malaria. Both of these classes are reported in Volume V., and it may be said that the medical impairment classes reported in Volume IV. are reasonably homogeneous except with reference to physique, habitat, and family longevity. Upon these three items and total abstinence and occupation depend largely the severity of selection, as it is constantly set forth in the text,—if all three are favorable and the occupation is one which gives a low mortality, such as farming, teaching, etc., we get the condition known as

super-selection, and this in itself tends to give a favorable mortality in spite of a medical impairment. Too much importance, however, may be ascribed to super-selection in explaining mortalities which are below our preconceived notion. It must not be forgotten that the basic data of the Medico-Actuarial mortality table were risks which included everything that the Companies issued that was not absolutely substandard, and even those that were substandard by reason of occupation alone or substandard by reason of family history alone. If we exclude all classes of medical impairments, of questionable or hazardous occupations, and the worst of the Southern States, the mortality falls to 85% of the M. A. table, as is set forth in the study of malaria in Volume V. I think it is worth while just to go over that. There was a large class of cases which had had one attack of malarial fever or intermittent fever more than five years previously, and when the Committee excluded in its study of malaria the seven Southern States which include the Gulf States, and Georgia and Arkansas, the mortality in the class in the other States and Canada fell to 85%. We first divided the class into two sections, those who had had one attack of malarial intermittent fever between five and ten years previously, and those who had had one attack more than ten years previously, and the mortality in one division was 85% and in the other division 84%. Apparently one attack of malarial fever more than five years ago was a very favorable thing to have had in the Northern States and Canada, but it means simply that in that particular class all other impairments were excluded, all questionable occupations were excluded, and the seven Southern States were excluded, with the result that we get a super-selection of 85%. It is worth while to read over mortality percentages of the various policy years—84%, 79%, 85%, 87%, 91%—those are for the first five years; and then six to seven years, 86%, eight to ten years, 83%; eleven to fifteen years, 80%. It shows simply what is done by the method of selection in that case where everything harmful is excluded, and it shows that a considerable bit of an impairment could

have been added on in those cases without increasing the mortality.

The American table compares roughly after the fifth year with about 150% of the Medico-Actuarial, but prior to that time the mortality in the American table runs considerably higher—that is to say, it would be in the first year of insurance and in the youngest ages of life nearly 250%, and those facts have to be borne in mind in comparing the M. A. with the American table, that it is considerably lower in the younger years of life and in the earlier years of insurance, there being no allowance for selection in the American table.

The picture which Dr. Dwight presented of an ideal Medical Director is a perfect dream, and I am afraid it is an iridescent dream. There is the ideal Actuary who makes the plans of insurance so attractive that applicants come rushing eagerly for insurance without any soliciting. There is the ideal Agency Director, who so coaches his force of agents that they are able to spot an overweight at once without submitting it to the Company, and never present a case that has been turned down by another Company without a preliminary request. Those are ideals. Most of us are nominal Christians but few of us get up to the ideal. We all hope we will get there some day, but they are ideals as yet, not realities.

Dr. Porter—We are very fortunate indeed to have with us Mr. Arthur Hunter who has kindly consented to tell us something about the proposed new mortality table.

#### PROPOSED NEW MORTALITY TABLE.

BY ARTHUR HUNTER, F.A.S., F.F.A.

*Actuary, New York Life Insurance Company, New York.*

You have doubtless seen in the insurance periodicals a number of references to the new mortality table, and it may be of interest to give a brief statement regarding it.

In the fall of 1911 the Convention of Insurance Commission-



## Hunter—Proposed New Mortality Table 47

ers asked the Actuarial Society of America to "turn its attention to the construction of new mortality tables covering the general experience of the companies among normal lives." The Actuarial Society appointed a committee, which pointed out that if the request for a new table were based on the assumption that lower reserves would be required and that the cost of insurance would be lowered, there was likely to be disappointment. The Society, however, expressed its intention to take up the work when the way was clear, *i. e.*, after the Medico-Actuarial Mortality Investigation was out of the way. Before that investigation was completed, however, the Convention of Insurance Commissioners, in September of 1914, requested the Actuarial Society to compile at its earliest convenience a mortality table representative of the "true mortality of the several companies"; and in the following April the Executive Committee of that body appointed a committee of five Department Actuaries to co-operate with the Actuarial Society.

It may be seen, therefore, that the request for the new mortality table proceeded from the Convention of Insurance Commissioners; it was not desired by the Actuarial Society, as may be seen from the great differences of opinion expressed by the members at a discussion in May of this year. That discussion indicated also that the large companies were not unanimously in favor of preparing the new mortality table at this time.

As the matter was an important one, the Actuarial Society deemed it advisable to invite the American Institute of Actuaries (which represents the younger companies in the South and West) to send representatives to confer with us. After the committee of the Actuarial Society prepared the tentative plans, they were submitted to the other two committees, and, after consultation, some changes were made. It may interest the members to know the general lines upon which the investigation will proceed if enough companies announce their willingness to contribute their data and to share the necessary expense.

The tentative plans provide for the State being marked on the records, so that an investigation may be made of the mortality by States or by groups of States. The data for Canada and for the United States will probably be treated separately.

As the table may be used as a basis for premiums or for reserves, the table will be based on the experience on amounts insured. It is probable that the mortality according to the principal plans of insurance will be investigated.

In order to obtain a modern experience, the statistics will be taken from the policy anniversaries in 1900 to the policy anniversaries in 1915 *for all years of issue*. Please note that it is not the experience under policies issued within that period, but the mortality experienced during that time irrespective of the year when the policy was issued.

It is desirable to have the experience of the younger companies as well as of the older companies, and, accordingly, all companies which are ten years old at the end of this year and have \$10,000,000 insurance in force, excluding assessment, fraternal and reinsured business, will be invited to contribute their data. Some plan will be formulated, after the names of the contributing companies are known, to prevent the large companies from having a preponderating influence in the results of the investigation.

The new investigation will be on entirely different lines from the Medico-Actuarial, which dealt principally with lives that were expected to show a higher mortality than the normal. As the new table is to be based on normal lives, all policies which have been issued with an extra premium, placed in a special dividend class, or otherwise treated as substandard, will be excluded. Women who were charged an extra premium, or put in a special class on account of sex, are, however, to be included. It is probable that a separate experience will be prepared on men and on women, but this has not yet been definitely decided upon.

The foregoing indicates that there are likely to be several tables prepared, and that we may obtain additional light on one or two interesting subjects.

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The new mortality table will probably show a lower mortality than the American, except at the older ages, after the effect of medical selection has disappeared. Nevertheless the reserves under the new table will probably be as great as, if not slightly greater than, the American if they are based upon the "ultimate" rates of mortality—*i. e.*, the mortality after the effect of medical selection has worn off. As it would need a technical explanation to make this matter clear, I shall not enter into it at this time. The net premiums will probably be lower under the new table than under the American, but the cost of insurance to the policyholder is not likely to be materially different because the cost depends upon the actual mortality experienced in the companies which issue participating policies. The gross premium depends upon the basic table, but the cost of insurance depends on the dividends which generally take account of the true mortality.

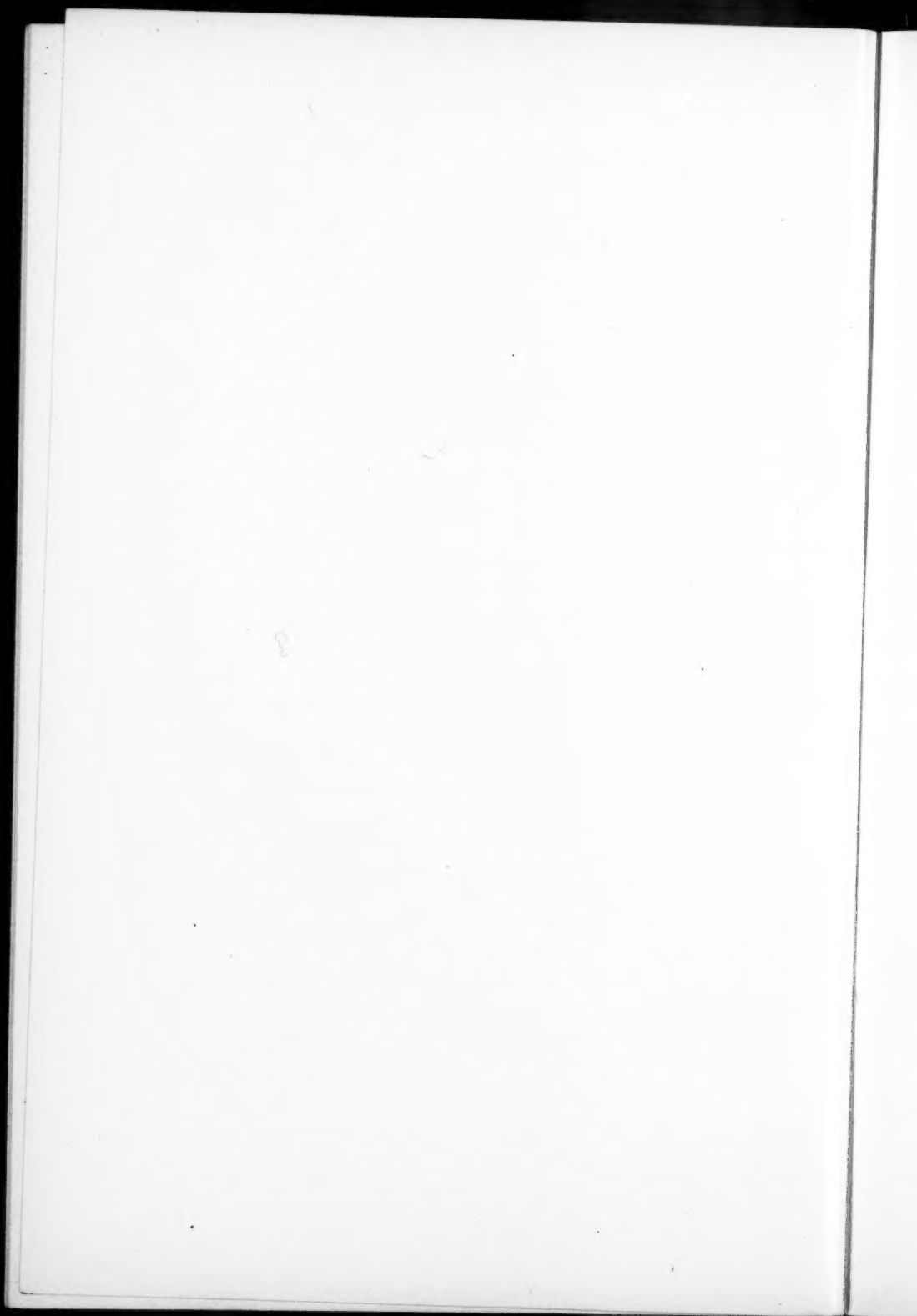
While the proposed new table is of greater interest to actuaries than to medical directors, information would undoubtedly be obtained which would assist in the selection of risks.

Dr. Porter—I am sure we are all very much indebted to Mr. Hunter for this valuable insight into this new work, and I only wish the time permitted of further remarks on the subject, but unfortunately it does not. We are most fortunate in having here Mr. Rhodes, Vice-President of the Mutual Benefit Life, and I have asked him to give us his impression of the best methods which can be adopted to derive the greatest amount of benefit, as observed from the standpoint of the Executive Officer. I therefore call upon Mr. Rhodes to discuss that aspect of the question in connection with Dr. Dwight's paper.

Mr. Rhodes—I think, Sir, that first of all I would like to thank Dr. Dwight for the language of his first paragraph in which he speaks of the extremely efficient and self-sacrificing efforts of certain members of the Committee. I want to thank him on behalf of myself for that language, because those of you who do not know me may think that I am included among the "certain members," and if he had been more spe-

cific you would know that I was not. There is very little to say in criticism of Dr. Dwight's paper. Perhaps the only exception that I would take to what he has said is his statement that 150% of the M. A. Table may be considered as representing the American Table. I think that is getting back pretty close to the old idea of assessment insurance, because you cannot keep that percentage there without a steady progression of new business. That statement means that if a company has a mortality experience equal to 100% of the M. A. table, it will have 66% of the American table. I think that we would all have trouble in realizing a mortality of 66% of the American table, unless we had a pretty steady influx of new business, or unless we were so strict in our selection that we would not have any agency force. The question is, how can this investigation be used to the advantage of the companies? It must first be understood by those who have to handle it, and it cannot be understood without a very large expenditure of time and thought. The Committee could furnish the facts, but it could not furnish the brains with which to use the facts, and that is up to the Executive Officers and the Medical Directors of the different companies. In the Mutual Benefit we have started on a little program of education. We have selected four classes, the build classes, the liquor classes, women, and those having to do with specific disease, and we have published for the benefit of our agents charts with explanatory text, setting forth the results of the M. A. investigation. I put a set of these in my pocket and I will leave them on the table. Dr. Van Wagenen will, I am very sure, be glad to furnish any of you gentlemen with copies if you desire them. Now we are going to close in on our acceptance of heavyweights. We are preparing our agents for it. We are also going to close in on other classes. We are letting them see how heavy weights look. I do not know whether you gentlemen can follow the lines of this small chart or not, but we have departed from the usual statistical way. Our base line runs vertically instead of horizontally. Here is the mortality of those who are 50% overweight, this



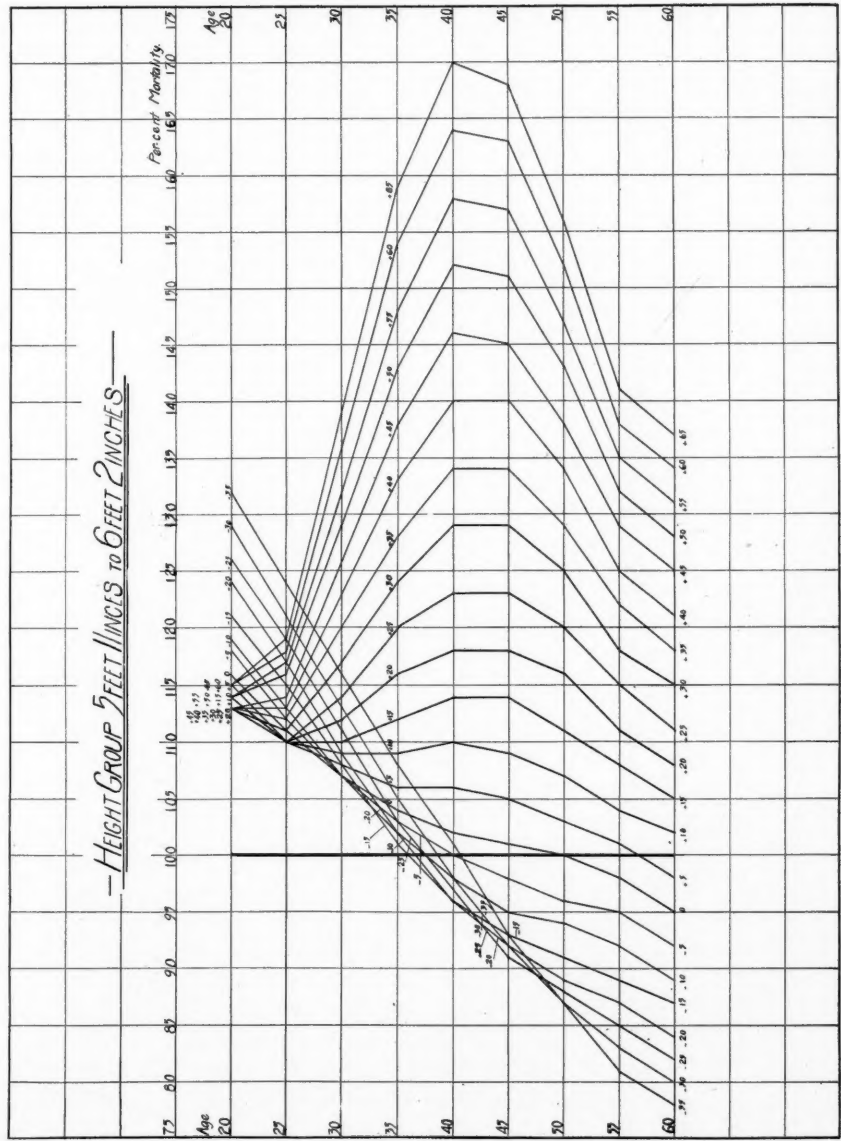








# HEIGHT GROUP 5 FEET 11 INCHES TO 6 FEET 2 INCHES





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being 100%, and here is the mortality of another group—and you can imagine, I think, that a group of heavyweights that would have a mortality of about 190% of the M. A. table would have just about that build.

Now we are going slow. No company can kick over the traces and set up rules for the acceptance of risks which differ very materially from those of other companies. We must follow pretty closely along the same lines. We have got to have our agency force fairly well educated to the class of risks that we are willing to accept, so that we can accept, according to our rules, something better than 92% of the cases that they submit to us. Now we want to change our rules a little, but we don't want to change that percentage, we do not want to decrease it, and so we are doing this educational work, and pretty soon there will be a gradual tightening up on some of the cases. Not that we want to get the lowest possible mortality. We could do that very readily, but it would not be good business, it would not be good underwriting. We can, however, use the M. A. results to show us wherein we have been too stringent and wherein we have been too lax. Not that we could take those classes in the M. A. investigation which show a low mortality and say "Here, we will throw down the bars and take them freely." We would soon find that we were not getting the mortality that was shown in the M. A. investigation if we did that. We have got to first ascertain how our mortality experience compares with that of the M. A. table,—in our case we find that it is about 90%. Then we have to study these cases, we have to form some ideas of the average standard of selection that prevailed in the data that went to make up that experience. We have got to compare that with our own, and then we must determine whether we can loosen up or whether we must tighten up.

I brought over with me also some charts which I shall be glad to leave here, dealing with the question of build, dividing the cases into the short men, the medium men, and the tall men. There are three separate charts and they are rather interesting. The trouble with the table that appeared in

Volume II. of the Committee's report showing the mortality in the build group was that it did not take account of height. We are trying to remedy that here. Here is the chart of the medium height men. The heavy line represents 100% mortality. The ages run down the scale, the mortality across. Notice the mortality among men 65 lbs. overweight. It is fairly favorable at the youngest age, but it increases very rapidly, going up to about 153% at age forty-five, and then falling back again. Now the underweights show a high mortality at the younger ages, decreasing at the older ages. I will leave the charts here and you can study them out for yourselves if you are interested. I would like to comment briefly on the difference between the short men, the medium men, and the tall men, with the various degrees of overweight, but I think I have said enough to give you the lines upon which the Mutual Benefit proposes to use the results of the M. A. investigation. I thank you for the opportunity to come here and listen to this discussion.

Dr. Jaquith—Knowing of Dr. Dwight's close association with the work of the Medico-Actuarial Committee and of the thoroughness with which he treats his subject, I felt it would be impossible for me to add anything of value and, therefore, very reluctantly consented to participate in the discussion of his paper. The time at my disposal will permit of comment being made only on two or three points.

I am inclined to think Dr. Dwight lays undue stress on the fact that, as he says, "comparatively few of these classes as studied in this investigation have been so thoroughly sifted as to eliminate all impairments aside from the one which is being tested." Wherever two impairments were recorded, the case was excluded, but this did not secure the exclusion of cases where, in addition to a recorded impairment, there existed another not included in the schedule of classes to be investigated. As, however, cases were excluded in which the unrecorded impairment was deemed of sufficient importance to affect the rating of the risk, it is evident that only relatively few specially selected cases with more than a single

## Hunter—Proposed New Mortality Table 53

impairment have been included. Moreover, the special care used in handling such cases would generally counterbalance the effect of the extra impairment, confirmation of which statement is to be found in Volume IV. of the report in which the Committee states that "there were indications that the companies had exercised a more severe selection in cases with two impairments than in those with a single impairment." I think, therefore, that we shall be entirely justified—as we shall certainly be safe—in assuming that the experience in a given class is that on absolutely first-class risks except for the impairment in question.

Dr. Dwight points out that had this investigation been based on a consideration of attained ages, irrespective of duration from issue of policies, the results might have differed considerably. This is quite true, and, to my mind, one of the virtues of the report is that the very serious misrepresentation of facts which undoubtedly would have occurred under a purely attained-ages method has been avoided. An instance comes readily to hand in the case of overweights. Using entry ages and durations, it was found that the maximum mortality percentages appeared, not at the oldest entry ages, but at entry ages forty to forty-nine. Entrants from age fifty onwards showed decidedly better results and on an attained age basis would have appeared as improving after later middle life. The actual facts were, however, that the selection had been much severer at the older ages, the proof thereof being that entrants at earlier ages showed mortality growing steadily worse as they grew older, as the following figures extracted from pages 20-21, Volume II., sufficiently indicate:

## MALE ENTRANTS AT AGES 30-49.

Policy Years	MORTALITY RATIOS	
	25 to 45 Pounds Overweight	50 Pounds or More Overweight
1-5	107%	116%
6-10	137	171
11-15	153	199
16-24	167	207

We have thus a striking instance of flat contradiction as between the results of using a mortality table taking account of ages at entry and durations and one using attained ages alone. The first indicates steadily growing deterioration of overweights up to a high age, while the latter indicates an improvement in later life, which has not the faintest warrant in the statistics from which the conclusion is drawn.

I agree with Dr. Dwight that a company's own methods of selection are of great importance. A single company's experience, however, is generally of less value than an aggregate of many companies, first, because of its smaller extent and, second, because it rarely happens that the methods of selection have been uniform in a given company for long enough to procure sufficient data homogeneous in this respect. Indeed, reasonable progress calls imperatively for continual changes in the methods of assessing risks and the effect of these changes will frequently be greater in a single company than in an average of many companies. Put in another way, a change of practice made by a single company may have a marked effect on its own results, but would have very little on the combined results of a score or more of companies.

As the question is frequently raised as to the best practical means of translating excess mortality in the Medico-Actuarial experience into dollars and cents of extra, it may be of interest to mention our office custom in this connection.

## Hunter—Proposed New Mortality Table 55

When endeavoring to interpret the results recorded in the various tables of the Medico-Actuarial Report, with Dr. Symonds I believe it of utmost importance that careful attention be given to what appears in the text of each volume. In the first place, if the impairment under consideration is one included in the Medico-Actuarial investigation, we make sure that the life is otherwise satisfactory. Next, we try to satisfy ourselves that the ratio supplied in the report is not an accidental one, owing to paucity of data, a point which may generally be settled by comparison with adjoining entry ages and in some cases with cognate classes. If the given ratio appears normal, our feeling then is that while not entitled to be considered as absolutely correct, it is likely to be much more reliable than the available alternative, consisting merely in a general impression as to the importance of the impairment. There being several fixed tables of extra ratings in use, the Actuaries of the company have supplied us with approximate percentage of extra mortality which these respectively cover, and that most appropriate is chosen. Of course, the whole circumstances of each application are carefully reviewed, but the Medico-Actuarial results form a very valuable starting-point in connection with such impairments as are covered in the investigation.

Dr. Fisher—I think the Northwestern is the pioneer in the field with respect to taking the mortality in the family history. In 1886 we took our mortality and we divided it up into cases where the parents had lived to be seventy or over, and we got much more favorable mortality on that class of risks. We have taken the mortality of the data that we sent to the Medico-Actuarial Committee, and we are something like 17% better in our worst class of cases than the Medico-Actuarial, and most of our work has been done along those lines, in selecting risks according to the longevity shown in the family record. We have brought that out in our application, and I think we have gotten a fairly favorable mortality in the heavyweights—in fact the very heavy weights we have not taken as yet, having taken only the average weights.

Dr. Dwight (closing the discussion)—Mr. President and Gentlemen: There is very little that I wish to add, not because the subject is not big enough to allow more discussion, and not because there is not a good deal more that I should like to say. There were a few points brought out in the discussion which served, I think, to emphasize the points that I tried to make in my original paper, and I will very briefly speak of them. I expected that I should hear rather more than I have with regard to my comparison of the American table with the M. A., using the autocratic figure of 150 to represent the comparison. I think I said that that was good enough for our present purposes. As a matter of fact, according to the figures that I have before me, it varies with various ages, from 175 to 103, but it seems to average about 150, and as I wanted something which would represent on the M. A. tables what the American experience curve does on our own, I took what I thought would serve for that purpose.

Dr. Jaquith has brought out two or three points which to my mind emphasize the importance of the main idea which I intended to run through my whole paper, and that was the importance of studying and understanding the results of the M. A. investigation. I have no intention of criticizing the methods used in the M. A. investigation. I simply want to call attention to the fact that they differ from those of other investigations and that the ways in which they differ should be recognized by those expecting to get anything from the results. Dr. Jaquith thinks I have taken the question of homogeneity too seriously. Dr. Fisher answered that for me, if you will notice, and his mortalities on heavyweights were very much better where they had a better than average family history. Family history is, to my mind, a very important impairment and there is no kind of a family history more important than the short family history. If you combine, as we have combined in these tables, cases with a short family history and a long family history, our groups are not homogeneous. We did sort out those impairments which we recognized for the purposes of our investigation were impairments,



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but there were a whole lot of others which were not removed. Dr. Symonds spoke of a number. These classes are not on an average homogeneous; I simply follow Dr. Symonds, and I cite the one case which Dr. Fisher spoke of, heavyweights with short family histories. The family histories of tuberculosis which we have here are not in homogeneous classes, and the group as a whole is not made up of homogeneous classes. You have three groups, light and heavy weights and family history of tuberculosis, and the general mortalities are influenced by the presence of those other impairments.

The question whether a table should be based on attained ages or ages at entry is not one which I was discussing. I simply intended to call attention to the fact that this particular investigation was based on ages at entry, and I should just for a moment like to call your attention to the effect of such arrangement. Take, for example, this group of occupations having to do with the liquor business. If you take it at its face value you have a trend which is high in early life and good in late life, compare that with the family history of tuberculosis. Here we have a mortality which is high in early life and good in late life, with the exception of three classes. If we take these at their face value, without any consideration of the fact that these examinations were made in late life, it would appear that all of these cases were bad at early ages, that they became good and stayed good. Our own investigation, based on attained ages and modified by that, shows that with the family history of tuberculosis they do begin bad and they get good and stay good, so that whether we take them at attained ages or ages at entry we have the same result. Now when we take the occupations—in the liquor business with the M. A. we get good results in late life; with the New England we get bad results in late life. As Medical Directors we are treating these cases as we see them, as they present themselves to us at our table. A young man of twenty-five, normal weight, applies to us for life insurance. He is applying for any kind or any form that you like. We want to know what that individual mortality is going to be

not only for the next five years but for the next twenty-five years. Let us take these two charts. In the early ages every company had bad results so far as we know; after they reached thirty-five, whether based on attained ages or on ages at entry, the results were good; in other words, we did not pick our cases so that they were good in the young ages and we did pick them so that they were good in the older ages. Apply that to the question of occupation—both charts bad in early life: one good in late life, the other bad. Does that mean that the man who goes into the liquor business, like the man who has a family history of tuberculosis and whom we examine at age twenty-five, is going to give us a good mortality on his group if he lives ten years? Probably not. I believe that this means that we have a good late life mortality, and this means that those men being examined at that particular period after they have passed through the ordinary effects of the liquor business, after they have got by the question of moral hazard, the alcohol stage, or whatever it may be, at that stage we can pick good risks; but if you take them at an early stage you get bad mortalities in late ages. Now all that I want to call your attention to is the fact that these were taken at ages of entry and not at attained ages, and when we are comparing these statistics with other statistics, we should appreciate the method as well as the facts.

The tellers announced the result of the ballot for the nomination of officers, as follows:

PRESIDENT

DR. F. C. WELLS

FIRST VICE-PRESIDENT

DR. HOMER GAGE

DR. JAQUITH

SECOND VICE-PRESIDENTS

DR. JAQUITH

DR. E. W. DWIGHT

DR. A. B. WRIGHT

SECRETARY

DR. F. S. WEISSE

TREASURER

DR. A. S. KNIGHT

EXECUTIVE COUNCIL

DR. G. A. VAN WAGENEN

DR. E. W. DWIGHT

DR. A. B. WRIGHT

DR. JAQUITH

Dr. Jaquith asked the privilege of withdrawing his name as first Vice-President and member of Executive Council. Dr. Dwight asked to have his name withdrawn as second Vice-President; and Dr. A. B. Wright also withdrew his name as second Vice-President.

Dr. Henry Wireman Cook then read the following paper:

Dr. Cook—My paper will show, I think, and I believe that Dr. Gage's also will show, that we find it a practical impossibility to adhere strictly to the definition given us by the Program Committee—that is, to divide the consideration of peptic ulcer strictly into medical and surgical papers, so that I must ask your indulgence for the portions of my paper that encroach upon the subject-matter as represented by the title

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of Dr. Gage's paper. I have also taken the liberty of varying the title from "gastric" ulcer to "peptic" ulcer, as I understand that what the Program Committee wanted was a discussion of peptic and duodenal ulcer.

PEPTIC ULCER FROM THE POINT OF VIEW OF  
MEDICAL SELECTION.

BY HENRY WIREMAN COOK, M.D.,

*Medical Director, Northwestern National Life Insurance  
Company, Minneapolis, Minn.*

In a search of the literature for reliable statistics bearing upon the mortality from peptic ulcer, we could find nothing. Individual clinicians or clinics have given the immediate mortality from operation or other treatment, and have estimated to percentage of cures, but in most part the history of the cases is not followed over a long enough period to justify the conclusion, or else the number of cases is too small to permit accurate deductions, and in no instance could we find that the cases had been studied in comparison with a table of approximately normal mortality.

There is very little of value in estimating the actual mortality from any disease or condition to say that 70% or 80% were well in five years, or that 30% were improved, etc., without regard to the normal expectancy for each age group and without regard to other modifying factors. We therefore felt the necessity of obtaining statistical material of a different sort than is at this time available.

The accompanying chart was used to collect the data, which in every case was taken from the original history sheet.

Our data was all transcribed on large sheets direct from the original history sheets in New Orleans, Baltimore, and Ann Arbor, and by highly recommended medical students, and in Rochester by trained clerks from our Actuarial Department, working under our personal direction.

## GASTRIC ULCER

IF MORE THAN ONE ADMISSION,  
USE SEPARATE LINE FOR EACH.

[illegible]

2

[illegible]







It is with particular gratitude that I acknowledge the courtesy of the Mayo Clinic in putting their wonderful wealth of material at my disposal, of the John Hopkins Hospital, the Charity Hospital in New Orleans, and the courtesy of Professor Hewlett in furnishing the records from Ann Arbor.

Our data was all transcribed by specially recommended medical students, and in Rochester by trained clerks from our Actuarial Department, working under my personal direction and in association with one of the clerks from the Mayo Clinic History Filing Department. It was then rewritten on cards at our office.

In our wider search for reliable data, particularly for subsequent history of the cases, we were surprised to find how incomplete are the histories of many private and hospital clinics,—“cures” being freely reported as the result of treatment, with no further report from the patient, after two or three weeks’ observation. Such histories are, of course, worthless from our point of view.

The number of individual cases reviewed was 1,599, with record of observation in the majority of cases of from three to ten years.

So much advance in the symptomatology, diagnosis, and treatment of Peptic Ulcer has been made during the past decade and a half, that we can think of the present clinical conception as practically a development of that period. Prior to 1900, when Dr. Robert F. Weir’s paper on “Perforating Ulcer of the Duodenum” first called serious attention to the duodenum as the seat of ulcer, the clinical recognition of peptic ulcer was ordinarily confined to those cases of gastric ulcer which gave the classical symptoms of epigastric pain referred to left shoulder, vomiting, localized epigastric tenderness and hæmatemesis.

We now know that only a relatively small percentage of peptic ulcers give all these symptoms, and recognize that in many cases the hyperchlorhydria, the pyloric spasm, the indigestion, etc., that were formerly confidently treated under the staggering nomenclature of the gastric neuroses, are in

reality cases of organic disease of the appendix, gall bladder, pancreas, and of the stomach or duodenum.

That we are still constantly overlooking organic disease of the stomach and duodenum, is strikingly illustrated by two cases mentioned by Dr. Louis B. Wilson, of the Mayo Clinic, in both of which eminent clinicians reported negative findings, and a competent surgeon had performed a laparotomy with negative findings, and in one case in Rochester a perforated duodenal ulcer was found three inches below the pylorus, and in the other, carcinoma of the cardia.

The group of cases of "indigestion," "dyspepsia," "gastric neurosis," "hyperchlorhydria," "pyloric spasm," is steadily declining in carefully worked clinics, as the cases are listed under more accurate diagnoses.

Vander Hoof gives the following percentages for the seven leading classes into which 1000 consecutive cases of chronic or recurring indigestion were separated by careful diagnostic work, confirmed in many cases by laparotomy: Appendicitis, 24.6; Cholecystitis, 11.7; Neurosis, 10.1; Peptic Ulcer, 9.4; Gastritis, 3.6; Visceroptosis, 3.4; Cancer, 2.3.

In a paper in which the primary interest is insurance selection, we cannot profitably spend too much time on a discussion of the clinical signs and symptoms which cannot be obtained in an ordinary insurance examination. I take it that in a study of any clinical manifestation such as peptic ulcer, we want assistance in analyzing such signs and symptoms as an insurance examination will reveal, with the idea of being able to properly group the individual case and then to have as definite an idea as possible of the mortality which may be expected from the group or groups.

The proper classification of the individual case is strictly medical diagnosis and is a medical problem, and in our case is always limited by the necessary restrictions of a practical insurance examination; the rating of the group is "prognosis," and given data on a sufficient number of cases over a long enough exposure from which a reliable calculation can be made,—it becomes primarily an actuarial problem.

In a study such as this, we must keep these two elements—medical diagnosis and actuarial prognosis, clearly in mind.

I have had the advantage, in preparing this paper, of the collaboration of my colleague, Mr. H. W. Allstrom, Associate Member of the Actuarial Society. Our records were taken purposely from different clinics, from different sections of the country, so as to attempt a fair average of cases which receive the best clinical and surgical advice and treatment.

The group of cases represented by these clinics has had the benefit of the best advice and the best treatment, if any treatment was permitted, so that in one sense they are a select group, but on the other hand, they are in great part the more serious and more chronic cases. Undoubtedly many cases of peptic ulcer recover without special treatment, or under the care of the regular family physician, the majority never being differentiated from "indigestion" or "gastralgia." Our groups are, however, probably fairly representative of cases which are definitely diagnosed as ulcer.

As stated, our records obtained from clinical cases undoubtedly represent a more serious group of peptic ulcers,—that is, those requiring radical treatment. Records of policy-holders with a history of peptic ulcer would, on the other hand, show a very select group, and if a group of ulcer cases had been shown in the Medico-Actuarial investigation, an approximately fair rating would lie somewhere between this percentage and ours.

We shall show the actual tables resulting from our investigation, and then venture to modify their indications into what appears to us to be the most reasonable interpretation possible with the available data.

We cannot here give more than passing notice to the etiology, pathology, or treatment of peptic ulcer, except as the latter may influence the prognosis.

Rosenow's recent work demonstrating the streptococcus as the characteristic bacterial finding in old ulcer, is most suggestive of the condition being an infective process, and that

in the treatment of these cases it is highly important to locate and eradicate the original site of infection, inspecting the tonsils, teeth, appendix, gall bladder, etc., just as to-day we would not simply treat rheumatic fever as an arthritis.

Such a very large proportion of ulcer cases give a long history of dyspepsia and indigestion antedating the more presumptive symptoms of ulcer, that it is at least possible that the infection ordinarily takes place in conditions leading to chronic gastric stasis and irritation of the mucous membrane. Here, however, we must also bear in mind that true ulcer may only give symptoms of indigestion, gas, discomfort, etc., over long periods, or may even be entirely latent.

A number of cases are associated with chronic appendicitis and chronic cholecystitis which may act as a causative factor both by furnishing a spot of infection and also by causing more or less chronic gastric disturbance and stasis. Any other condition associated with lowered resistance, such as anaemia, neurosis, etc., may furnish the predisposing factor, and when any source of infection exists, the peptic ulcer may result. Once established, the constant bath of acid gastric secretion tends to prevent healing.

Treatment concerns us here only as affecting a subsequent ruling, and yet the present status of treatment of peptic ulcer is so strikingly divided among the highest authorities that perhaps in no other condition is there such direct conflict between medical and surgical treatment. Sippy in this country, and Boas abroad, represent the extreme of confidence in medical treatment. Sippy confidently believes that a very large majority of cases, even with considerable chronic obstruction, can be cured by neutralizing the gastric acidity, and proper diet, and Boas goes so far as to state that all symptoms are relieved in fourteen to eighteen days under suitable treatment, and that he never has occasion to use operative measures for uncomplicated chronic ulcer except in rarest cases.

The surgical point of view is voiced by Mayo when he says he can see little difference between the medical cures and the

usual abatement of active symptoms, which is one of the periodic and characteristic symptoms of peptic ulcer.

There is no question that some cases of peptic ulcer recover without operative interference, but I have seen no evidence based on the subsequent history of a sufficient number of medical cases over a period of five to ten years which would justify the optimism in regard to a permanent cure by medical and diatetic treatment in so large a proportion of cases as claimed by some. On the other hand, our cases do show conclusively that surgical treatment does cure for five years and more, a considerable proportion of serious cases of peptic ulcer, when dietetic and medical treatment over a long period of years has failed. Our cases show cured and improved, 77%. Graham's figures for the Mayo Clinic experience are 67% cured, 19% much improved. As Dr. Barker of Johns Hopkins Hospital says: "The question of therapy is still open; medical men and surgeons must continue to work together on this problem until the interchange of opinion and experience bring us at length a conclusion."

This conclusion will no doubt be a compromise between the two views, developing a more definite demarkation between cases suitable for medical and surgical treatment, unless some specific treatment or operation should be devised which will offer more positive results than are obtained at present. Dr. Mayo voices the best course open to-day when he says that those patients who can recover under medical treatment should be given a chance to do so. . . . "but that if permanent cure does not take place within a reasonable period, the patient should have surgical treatment."

The results of treatment in our cases are indicated by the following tables:

TABLE I.

RESULTS OF LATEST INFORMATION.

	Excisions and Pyloroplasties		Gastro-enterostomies		Other Operations		Medical Treatment		No Treatment	
	No.	%	No.	%	No.	%	No.	%	No.	%
Recovered	144	53	349	62	6	32	27	33	10	45
Improved	47	18	92	16	6	32	23	28	7	32
Unimproved	52	19	78	14	4	21	19	24	1	5
Dead	28	10	44	8	3	16	12	15	4	18
Total	271		563		19		81		22	

The foregoing table includes all those cases upon which subsequent information was secured. It does not include those which died within three weeks of operation or those of which nothing was learned after operation or treatment.

The following table gives a similar comparison, but only on those cases upon which the latest information was received more than three years after operation or termination of hospital treatment:

TABLE II.

	Excisions and Pyloroplasties		Gastro-enterostomies		Other Operations		Medical Treatment		No Treatment	
	No.	%	No.	%	No.	%	No.	%	No.	%
Recovered	81	62	146	67	2	33	12	44	5	83
Improved	20	15	37	17	3	50	8	30		
Unimproved	24	18	25	11	1	17	5	19	1	17
Dead	6	5	11	5			2	7		
Total	131		219		6		27		6	

In deciding whether a given applicant should be classed under peptic ulcer, we have, first, the frank admission of "ulcer" in the examination, which was formerly rare, but with better general diagnostic methods is becoming more

frequent; second, the cases from which ulcer may be suspected from the given history or examination; third, the cases in which it may be suspected from supplementary information obtained from the examiner.

A history of recurrent or persistent dyspepsia accompanied by epigastric pain, is highly suggestive of gall-bladder disease or peptic ulcer, particularly the latter, if the pain is related to the taking of food. The more characteristic pain of stomach ulcer is soon after taking food; of duodenal ulcer, before meals, at the height of digestion and of acidity, or when stomach is emptying.

Few blanks that I have seen inquire specifically for a history of peptic ulcer. It would seem from the seriousness of the condition and the increasing frequency with which it is recognized and treated, that the time has come to include this question in the blank, if different specific diseases are asked for. In those blanks which cover all diseases under the general terms of cardio-vascular, nervous, gastro-intestinal, etc., sufficient confidence is placed in the local examiner to expect him to elaborate these questions to the applicant, and the general question of gastro-intestinal disease would have to suffice.

In view of the comparatively recent recognition of the frequency of gastric ulcer, the suggestion that companies should give their examiners some advice on looking more closely for organic disease of the stomach is timely. "Indigestion" corresponds in the general practitioner's nomenclature in relation to gastric ulcer, about as chronic bronchitis did in relation to phthisis twenty years ago. Where examiners report indigestion, dyspepsia, abdominal pain,—we are, of course, accustomed to write back for more definite advice with particular reference to appendicitis, renal or hepatic colic. We should unquestionably, add inquiries aimed at eliciting evidence of peptic ulcer; that is, location of pain and radiation, evidence of localized tenderness, relation of pain to meals, if vomiting, if hæmatemesis.

There is considerable value to a definite question in the blank naming the specific disease. It certainly calls the examiner's



attention to its possibility, and he is more likely to elicit pertinent information by his questioning and his examination.

It is most important in obtaining a history of "indigestion" to ascertain whether the condition has recurred, the intervals of recurrence, and the months or years the condition has persisted. In considering a case of recurrent indigestion with pain, we must face the mortality of chronic appendicitis, cholecystitis, and peptic ulcer, where our investigation has eliminated a toxic cause such as tuberculosis, uremia, etc.

As would be expected, our figures show that first symptoms antedate treatment for a much shorter period in the medical cases than in the surgical cases; in other words, surgical intervention is usually delayed, and in a very large proportion of cases is preceded by more or less medical treatment. Surgical "cures," therefore, are in many cases enjoyed after the failure of medical treatment.

Of the 1599 cases, 58% had symptoms for more than five years; 23%, under one year; 19%, between one and five years.

Divided into medical and surgical:

Surgical: 65%, had symptoms for more than five years;  
11%, one year or less;  
24%, between one and five years.

Medical: 34%, had symptoms more than five years;  
33%, within one year;  
33%, between one and five years.

The practically universal symptom is indigestion, or indigestion and pain; 26% had indigestion, or indigestion and pain, without vomiting or blood; 41% had vomiting; 23% had vomiting of blood.

Of those cases giving first symptoms more than five years prior to the treatment under consideration, 20% had indigestion only, previous to the five-year period; 48% had pain; 27%, vomiting; 5%, blood.

Indigestion and pain is most frequently the earliest symptom, the vomiting and hæmatemesis tending to develop at a late date, and vomiting of blood in a large majority of cases



coming within one year of the time when radical treatment is sought. See following table:

TABLE III.

PERCENTAGE OF TOTAL CASES.

	Vomiting without blood	With blood
1 yr. prior	16%	15%
1-2 yrs. "	6	2
2-3 " "	3	1½
3-4 " "	2	1
4-5 " "	2	½
5+ " "	13	3

For the purpose of computing expected mortality, we eliminated those cases upon which no information had been obtained following treatment, and those which died within three weeks of treatment. The cases thus eliminated are shown in the following table:

TABLE IV.

CHARACTER OF TREATMENT	Excisions and Pyroplastics	Gastro- enterostomies	Other Surgical	Medical Treatment	No Hospital Treatment	Total
Total number of cases.....	380	763	39	345	72	1599
Died within three weeks of operation or treatment.....	13	39	7	26	1	86
Not heard from after operation or treatment.....	96	161	13	238	49	557
Balance from which subsequent information was secured.....	271	563	19	81	22	956

From these figures it will be noted that of a total of 1599 cases, 86 died within three weeks following treatment,—a

ratio of 5.4%,—surgical 5%, medical 6.6%. This immediate high mortality is undoubtedly due to the serious cases admitted to certain clinics, *i. e.*, cases with perforation, acute hæmorrhage, etc.

The favorable operative mortality of the Mayo Clinic, 1.5%, would probably be more representative of the best surgical treatment of interval cases. Dr. Mayo's estimate of general operative mortality for duodenal cases is 2%, with 3% to 4% for gastric cases. An immediate mortality of 2% covering all cases, medical and surgical, would probably cover an average experience on a group representative of the ordinary insurance applicant.

In estimating the mortality on successive periods following treatment, we must bear in mind that those cases which report subsequent history in reply to inquiry, will probably be the more unfavorable cases, and this tendency will increase directly with the length of the interval after treatment. That is, the well patients tire of answering the routine questions and tend to gradually drop out of sight. This tendency must be taken into account as modifying the high mortality shown, with its tendency to steady increase, and is illustrated by the following table. We have allowed for this tendency in our appended suggested rulings.

TABLE V.

NUMBER OF CASES ON WHICH SUBSEQUENT INFORMATION WAS RECEIVED  
LISTED BY YEAR OF LATEST INFORMATION

Years after operation or termination of treatment	Excisions and Pyroplasties	Gastro- enterostomies	Other Surgical	Medical Treatment	No Hospital Treatment	Total
1	52	72	8	30	7	169
1-2	45	160	3	13	1	222
2-3	43	112	2	11	8	176

TABLE V.—*Continued*

Years after operation or termination of treatment	Excisions and Pyloroplasties	Gastro- enterostomies	Other Surgical	Medical Treatment	No Hospital Treatment	Total
3-4	53	72	3	7	2	137
4-5	39	67	2	4	2	114
5-6	22	50	1	4		77
6-7	10	19		7	2	38
7-8	4	9		1		14
8-9		1		2		3
9-10		1				1
10 and later	3			2		5
Total	271	563	19	81	22	956

We have divided the mortality by years of exposure following treatment and by method of treatment, as follows:

TABLE VI.

MORTALITY AFTER OPERATION OR TERMINATION OF HOSPITAL TREATMENT, OR AFTER DIAGNOSIS AT HOSPITAL IF NO TREATMENT, MEASURED BY THE MEDICO-ACTUARIAL  
ULTIMATE TABLE OF MORTALITY.

Year	EXCISIONS AND FYLOPLASTIES				GASTRO- ENTEROSTOMIES				OTHER SURGICAL				MEDICAL TREATMENT AT HOSPITAL				NO TREATMENT AT HOSPITAL			
	Exposed to Risk	Expected Deaths	Actual Deaths	Ratio %	Exposed to Risk	Expected Deaths	Actual Deaths	Ratio %	Exposed to Risk	Expected Deaths	Actual Deaths	Ratio %	Exposed to Risk	Expected Deaths	Actual Deaths	Ratio %	Exposed to Risk	Expected Deaths	Actual Deaths	Ratio %
1	246	2.50	13	520.	530	6.43	20	311.	16	.26	3	1154.	66	.66	5	785.	18	.22	1	485.
2	249	2.64	7	123.	472	5.72	7	128.	10	.12	0		48	.50	2	1354.	18	.13	2	1538.
3	149	1.64	2	122.	269	3.72	6	161.	7	.10	0		26	.32	0	600.	10	.13	2	
4	101	1.17	1	85.	178	2.53	5	198.	5	.09	0		20	.26	0		5	.06	0	
5	57	.71	2	282.	111	1.67	4	240.	2	.05	0		15	.23	0	714	3	.03	0	
6	29	.29	1	345.	53	.82	0	417.	.8				8	.14	1		2	.02	0	
7	11	.14	2	1429.	16	.24	1	2000.					4	.09	1		.7	.01	0	
8	4	.03	0		3	.05	0	0					3	.06	0	1111.				
9	3	.02	0		1		0						2	.06	0					
10	1	.01	0		6		0						2	.06	0					
11	1	.01	0										.8	.05	0					
12	.2	.00	0																	
1	246	2.50	13	520.	530	6.43	20	311.	16	.26	3	1154.	66	.66	5	785.	18	.22	1	485.
2-5	511	5.62	12	214.	970	13.38	22	164.	25	.36	0	0	130	1.67	5	299.	33	.42	3	714.
Grand Total	51	.51	3	588.	74	1.12	2	179.					35	.73	2	274.	3	.03	0	

# SUMMARY.

YEAR	ALL SURGICAL CASES			MEDICAL TREATMENT AND NO TREATMENT AT HOSPITAL		
	Exposures	Expected	Actual	Exposures	Expected	Actual
	%					
I	792	0.19	36	84	.88	6
2 and later	1631	20.99	39	201	2.85	10
						682
						351

## MORTALITY BY AGE GROUPS.

1ST YEAR	EXCISIONS AND PYLOROPLASTIES			GASTRO- ENTEROSTOMIES			OTHER SURGICAL			MEDICAL TREATMENT			NO TREATMENT AT HOSPITAL		
	Exposures	Expected	Actual	Exposures	Expected	Actual	Exposures	Expected	Actual	Exposures	Expected	Actual	Exposures	Expected	Actual
	Ratio %			Ratio %			Ratio %			Ratio %			Ratio %		
Ages 30 and under	108	1.49	3	609	173	.88	6	.03	0	22	.15	1	665	7	.04
" 40-59	125	1.42	9	634	205	3.18	10	.08	1	259	.30	4	1333	7	.06
" 60 and over	13	.59	1	169	62	2.37	5	.15	2	1330	.5	.21	0	4	.12
Total	246	2.50	13	520	530	6.43	20	.26	3	1154	.66	5	758	18	.22
															1
															455

2d and Subsequent Years															
Ages 30 and under	248	1.31	1	76	348	1.82	4	220	6	.03	0	67	.34	2	588
" 40-59	254	3.31	10	301	173	1.74	15	205	15	.08	0	83	1.24	3	227
" 60 and over	24	1.49	4	269	117	5.21	5	96	4	.15	0	13	.74	2	270
Total	562	6.13	15	245	1044	14.50	24	166	25	.36	0	165	2.40	7	292
															36
															.45
															3
															667

# SUMMARY.

AGES	ALL SURGICAL CASES						MEDICAL TREATMENT AND NO TREATMENT AT HOSPITAL					
	1ST YEAR			2D AND LATER YEARS			1ST YEAR			2D AND LATER YEARS		
	Exposures	Expected	Actual	Ratio %	Exposures	Expected	Actual	Ratio %	Exposures	Expected	Actual	Ratio %
30 and under	287	1.40	8	571.	602	3.16	5	158	30	.19	1	536.
40-59	427	4.68	20	427.	884	10.98	25	228	36	.36	5	1389.
60 and over	78	3.11	8	257.	145	6.85	9	131	9	.33	0	
Totals	792	9.19	36	392.	1631	20.99	39	186	84	.88	6	682.
									201	2.85	10	351.

We did not feel that the number of our cases justified further subdivisions by age. After the first year following operation on the cases under observation, the ratio of actual to expected mortality is not definitely affected by age,—if anything, the tendency being to an increase in percentage with increase in age. On most of those cases dying within three weeks of operation, which cases are not included in our Table VI., but are shown in Table IV., the death rate, particularly at ages under 50, is not greatly affected by age, and the deaths can more properly be considered as a percentage of total operated on rather than a percentage of expected mortality. The same condition holds true to a large extent on the deaths during the first year but subsequent to three weeks after operation.

Including all surgical cases, the ratio during the first year following operation is 570% of expected on ages 39 and under, 427% from ages 40 to 59, and 257% on ages 60 and over. Where we have attempted definite insurance ratings, we have to eliminate the cases of "other operations," for the reason that they represent a poorer type of risk than will usually be found in insurance risks, being mostly exploration for perforations, many patients being moribund on admission. Considering, therefore, strictly the gastro-enterostomies, the excisions and the pyloroplasties, the mortality in the first year was 582% on ages 39 and under, 413% on ages 40 to 59, and 203% on ages 60 and above.

Analyzing our figures with reference to severity of prior symptoms, we find that the mortality on cases without vomiting or hæmatemesis prior to the treatment under consideration, proved much more favorable than those which had either simple vomiting or vomiting of blood. This would be naturally expected, as the cases with vomiting probably represent the later cases, after obstruction and stasis had developed. For example, gastro-enterostomies on cases without vomiting or hæmatemesis gave practically a normal mortality after the lapse of one year,—a ratio of three deaths to 3.21 expected. Excisions and pyloroplasties showed two deaths to 1.06 expected; medical treatment, three deaths to 1.01 expected.

Although the number of cases is too small for positive conclusion, the relation between the three divisions of treatment is similar to results in Table VI., and the ratio of actual to expected deaths is less than the total group shown in Table VI.

In order to give our work a more concrete value, we have ventured to suggest some rulings for different groups, which might be broadly deduced from our figures and from a free interpretation of them,—attempting to co-ordinate the percentages found with the results of general clinical observation. We appreciate that these rulings must be purely tentative, and we submit them with the idea that they may induce free discussion, and with the knowledge that they will be modified by subsequent data and by the individual judgment of anyone who may care to use them as a guide to action.

We think it advisable, in cases with surgical treatment, to limit consideration for any form of policy to cases that had been without serious active symptoms for one year, such as hæmatemesis, vomiting, severe pain, etc.

We have then divided other surgical cases as follows:

First: After gastro-enterostomy where there has been no previous vomiting or hæmatemesis,—accept standard after three years, providing there were no subsequent symptoms—between one and three years, rate 135% to 150%.

Second: After gastro-enterostomy, where vomiting or hæmatemesis had appeared in prior history,—refuse for standard for at least five years,—acceptable on rating for excess mortality of 150% to 175%.

Third: After excision and pyloroplasty, proving more unfavorable than after gastro-enterostomy,—we would suggest rating of 140% + when no previous vomiting or hæmatemesis,—increasing to 200% + when there has been vomiting or hæmatemesis.

Since the original draft of this paper was completed, the paper by Drs. Finney and Friedenwald has appeared, *American Journal Medical Sciences*, October, 1915, in which decided preference is expressed for pyloroplasty over gastro-enterostomy, so that this point must still be held *sub judice*. When it



is a choice between two methods of operation, the results will always be markedly influenced by the skill and familiarity of the operator in the particular operation of his choice. For example, when the difference in results is not great, a surgeon who performs pyloroplasty and has a large experience with a certain technique would get better results than with gastro-enterostomy; whereas a surgeon who preferred gastro-enterostomy might obtain the opposite results. The personal equation can never be lost sight of in considering any medical question.

Such is the character of operative procedure required for the radical cure of peptic ulcer that in this condition, particularly, the experience and skill of the surgeon will be an important factor in determining end results. Our figures and deductions would hold only where skilled operative procedure has been employed.

After medical treatment: In attempting to rate a case of peptic ulcer which has had any active symptoms within two years, particularly if vomiting or hæmatemesis—we feel that the possibility of operative interference with its immediate mortality must be allowed for, and that it could perhaps be more properly covered by an extra charge than by rating up in age.

The direct operative mortality we have estimated at 2%, and 3% for the first year following operation, or a total of 5%. This, including a good loading for possible fluctuation, would make the extra charge at least double that which we have been accustomed to add for recent attack of appendicitis without operation.

For the purpose of covering this immediate excess mortality, it would be most desirable to collect the entire extra premium the first year, but from a practical standpoint of being able to place the policy on a basis satisfactory to the applicant, it is necessary to distribute the charge for a few years.

In the appendix cases we have been charging \$10 extra the first year, this extra decreasing 20% for the next five years. In the ulcer cases, the extra would, of course, vary with

the severity of symptoms and interval since the last active symptoms.

In considering cases that have been free from symptoms after medical treatment or without special treatment for more than two years, we feel that they may be rated from 175% to 250% dependent upon severity of symptoms, particularly upon history of vomiting or hæmatemesis. Of course, the two-year period allowed for possible operative mortality in these cases is largely arbitrary, and the choice of a flat extra or a rating up in age will be determined by individual judgment or special features of the case. From fifth to tenth year after active symptoms, these cases may be rated at 150 % $\pm$ , and after ten years, may be accepted as standard.

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Dr. Homer S. Gage then read a paper entitled:

SURGERY OF GASTRIC AND DUODENAL ULCER IN  
RELATION TO THE INSURANCE RISK.

BY HOMER GAGE, M.D.

*Medical Director, State Mutual Life Insurance Company,  
Worcester, Mass.*

As surgery encroaches more and more upon the domain of internal medicine, and new operative procedures take the place of medical treatment in so many of the commoner pathological lesions, the Medical Director finds himself constantly face to face with new problems in medical selection and with very little data upon which he can base accurate or satisfactory decisions.

In many instances this is because the operative procedures are so new that no accurate opinion as to their effect on longevity is possible. Even after the necessity of surgical intervention has become apparent, and has been generally accepted, it takes a long time and much experimentation to develop a safe and satisfactory technique.

The operative mortality must be reduced to a minimum so that the operative risk shall be eliminated as nearly as is possible. The mechanical result must be so nearly perfect that no disturbance of function, no disability, not the necessary result of the original lesion, can be attributed to the surgical interference, and the relief from the distress and disability occasioned by the condition for which the operation was undertaken, must be greater and more lasting than can be secured by any other method of treatment.

Take for example the removal of the Gasserian ganglion for tic douloureux—having reduced the mortality to a minimum, having eliminated any unpleasant sequelæ due to the operation, and being assured by experience of a much longer immunity from pain than can be obtained in any other way, the surgeon feels that his interference has been fully justified.

And so it is, but here we see the difference between his point of view and that of the Medical Director. The latter must have a longer and a clearer vision. Not content with the degree of safety or the amount of relief secured, he must know in the case of a *tic douloureux* to what extent the insurance risk is impaired by its presence, and just how far that impairment is affected, if at all, by the relief from suffering which is so satisfactory to the patient and to the surgeon.

He must know what to infer from the presence of the original lesion. A brilliant and perfectly satisfactory surgical result will have little weight with him if the underlying cause of the lesion is a degenerative tendency which is unaffected by the removal simply of its manifest and most distressing symptoms. I think that failure to recognize this difference in view-point is the cause of much misunderstanding in the study of end results.

Another factor that is important for us to remember is that many of these procedures whose influence upon longevity we are called upon to determine, are really of too recent introduction to make accurate conclusions possible.

When one considers that almost all of the modern practice of abdominal surgery has had its origin and development within the professional lives of those present, one realizes how far we are from the end results which are necessary to statistical accuracy.

This is particularly true of the subject to which I venture to ask your attention for a few moments to-day, viz., the Surgery of Gastric and Duodenal Ulcer in its Relation to the Insurance Risk.

In an address on "Surgery in Relation to Life Insurance" by Dr. W. J. Mayo, delivered before the American Life Convention at French Lick Springs, last year, he said: "That an estimation as to the curability of any gastro-intestinal disease, based on data that was accumulated previous to five years ago, is practically worthless."

Although this seems to be an exaggeration, I think a little further consideration will enable us to see the justice of an

opinion which is founded upon the experience of the largest clinic in gastric surgery in the world.

We must remember that the surgeon didn't turn plumber until Doyen demonstrated the practicability of stomach drainage in 1895; that our knowledge of the relation, frequency, and importance of gastric and duodenal ulcers based on accurate statistical information instead of on traditional opinion, has all been gained since 1900, and is a complete reversal of the formerly accepted opinion; and that our old views of the nature, progress, and possible results of these lesions have undergone an equally radical change—made possible by the disclosures of a study of the living pathology in all its various stages, instead of being dependent upon a study of the terminal stages alone, as provided by the post-mortem examination.

So rapid has been the progress of our knowledge of these lesions, that it is very difficult, if not quite impossible, to bring the earlier and the later reports within the same classification. Mayo's limitation of accepted reports to five, now six years, will be seen therefore to be by no means unreasonable.

When I undertook the study of this subject for this meeting, I had hoped to be able to present the results of surgical interference in these cases somewhat in terms similar to the tables of our Medico-Actuarial Investigation, but after a very wide search in the literature of the subject and much correspondence, I have been disappointed to find that there are as yet no available statistics capable of such an interpretation.

My own personal experience has been far too small to be of value, but there is reason for much encouragement and hope in the establishment of follow-up systems in almost all of the great clinics of this country, by means of which a mass of material will soon be available for the construction of accurate percentage tables.

Meanwhile, however, you and I are having brought to our desks for inspection, with rapidly increasing frequency, applications for insurance from men who have had gastro-enterostomy performed for the relief of ulcer, who have been completely relieved of all symptoms, have gained substantially in

weight and general appearance, and who in their own opinion, in the opinion of their medical and surgical attendants, and most important of all, in the opinion of the General Agent, are good insurance risks.

What shall we do with them? We must pass upon them even if we cannot yet obtain the statistical information necessary to express the insurance risk in its relation to the A. M. Table.

Fortunately we are not without much valuable information on the natural history of gastric and duodenal ulcers under expectant treatment, and on the results of surgical interference. In the first place we have established the fact that these ulcers are much more common than we formerly supposed—that they occur in men oftener than in women, in proportion of three to one—which is contrary to our previously accepted opinion, and that they are essentially chronic with a tendency to recurring exacerbations of activity at irregular intervals for many years.

How persistent this tendency to recurrence is, was well illustrated recently in one of my own cases—a man 50 years old had always had what he described as a poor stomach, had been told ten years ago that he had gastric ulcer, and was treated medically in a hospital for some weeks with such marked relief that he called himself cured.

In the face of this history he obtained insurance five years ago in one of the companies here represented, and within two months received a policy from one of the large New York companies after a Home Office examination.

Two weeks later, while on the train between Springfield and Worcester, he was seized with sudden abdominal pain with partial collapse, was taken at once to the City Hospital—a diagnosis of perforated ulcer made, and operation performed four hours later.

Gastric contents were found throughout the right side of the abdomen, and he died of general peritonitis on the third day. There was an opening on the lesser curvature of the stomach near the pylorus, large enough to admit a lead pencil.

I cite this case, not in derogation of the medical treatment he had had ten years ago, for that had given him ten years of active business life without conscious disability—nor in criticism of the action of the medical department which approved his application, two weeks before his death, because we have all been much in the habit of considering that ten years, or even five years of complete immunity from symptoms, are enough to throw some doubt on the correctness of the previous diagnosis, and to establish a reasonable probability that the trouble, whatever it was, had been permanently relieved.

My object in citing it is to emphasize what I have just said about the liability of these lesions to become active again, no matter how long the period of quiescence.

Joslin and Greenough followed ninety-nine cases of gastric ulcer for a period of five years after their discharge from the Massachusetts General Hospital; none had been operated upon. At the time of discharge, over 80% were classified as cured. At the end of five years, 40% only were well; 40% had already had recurrence; 8% had died of gastric complications, and 4% of other causes; and they make this interesting comment: "It certainly is startling to realize that every other patient with gastric ulcer is either to have a recurrence of symptoms or is never to be well again."

I am convinced from my own study and experience that if the eighty-seven cases still living at the end of five years could be followed for five more, the percentage of those living and well would show the same marked diminution as was found at the end of the first five; and that the natural history of untreated or medically treated gastric ulcer is such that its presence in the history of an applicant makes the insurance risk definitely and permanently substandard.

Although we have no similar statistics in regard to duodenal ulcer, we have good reason for believing that the results would be more favorable. But until statistical evidence is available, the analogous pathology and clinical history of gastric and duodenal ulcer should make us extremely cautious in our discrimination between them.



Nor is this all. The study of living pathology made possible by gastric surgery has revealed gastric ulcer as the forerunner, if not the cause of a very large proportion of gastric cancers.

In the Mayo Clinic 71% of the gastric cancers presented evidence of a previous ulcer, and in Moynihan's Clinic the percentage was 72. The transitional stages of these changes from ulcer to cancer have been frequently observed and studied. Excision of the ulcer has often revealed to microscopic examination a beginning malignant degeneration that was unrecognizable from a gross inspection of the specimen—so that Dr. W. J. Mayo assures us that it is often impossible at the operating table to tell a cancer from an ulcer.

All this makes for caution when we come to study the relations of a history of gastric ulcer to medical selection. The added liability of malignant degeneration does not apply to duodenal ulcer, except when the ulcerated area has spread to the stomach side of the pylorus. Why this is we do not know, but there can be no doubt of the fact that cancer very rarely follows ulcer of the duodenum, while it is a not uncommon result of ulcer of the stomach.

I have dwelt upon this subject of the natural history of these lesions perhaps longer than I should, and at the risk of trespassing upon a field that belongs more strictly to the physician than to the surgeon, but I have done it because I felt that the natural tendency and results of these lesions should be thoroughly appreciated before one could fairly judge of the extent to which they are influenced by surgical interference.

Now what has been accomplished surgically toward removing the insurance hazard in these cases? Experience has demonstrated that relief is to be found by diverting the current of the gastric contents from the region of the ulcer by means of a new and more dependent drainage opening, and a posterior short loop or no loop gastro-enterostomy is the operation of choice for accomplishing this purpose.

Whether or no the ulcer-bearing area should be excised at the same time is still *sub judice* with the more radical opinion



at present steadily gaining favor. Our problem is the effect of a posterior gastro-enterostomy with or without excision upon the applicant's future health and expectancy of life, and from an insurance point of view, its consideration falls naturally under three heads.

First, the effect of a major operation; second, the possible unfavorable results which may fairly be attributed to the performance of this particular operation; and, third, the effect of the operation on the lesion for the relief of which it was undertaken.

In considering the effects of major surgical operations on insurance, one's mind reverts at once to the important paper read before this Association in 1904 by Dr. John Homans, on "The Effect of Mutilations on Longevity." Its general applicability is, however, considerably impaired by a failure to discriminate between the effects of the pathological condition for which the operations were performed, and the effects of the operations themselves, and one is hardly justified in drawing any more definite conclusions than that operations often fail to interrupt the natural course of disease, and sometimes create new sources of disability and impairment.

In the report of the Medico-Actuarial Investigation, recently published, is a table on the effects of major surgical operations which shows a mortality of 132% of the insurance table. The group is not a homogeneous one, comprises a great variety of procedures, and is made up of but 238 cases.

On the other hand the table in the same report, devoted to the effect of appendectomy, shows a very favorable result, and yet surely this ought to be regarded like every laparotomy, as a major surgical procedure, frequently accompanied by the gravest constitutional disturbances, by severer shock, and greater liability to adhesions and adhesive bands than is the ordinary gastro-enterostomy. I think we have no reason yet for assuming that an operation *per se* adds anything to the insurance risk, provided the immediate recovery is satisfactory and complete.

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plications which may follow as the direct result of operative interference, and which may have an important bearing on the insurability of an applicant.

In the case of gastro-enterostomy, the applicant is of course expected to furnish evidence that the result of the operation is entirely satisfactory at the time of filing the application. This eliminates the cases in which the contents of the stomach pass out through the natural or the artificial opening, only to find their way back into the stomach through the other one, the so-called vicious circle—a most serious complication, which usually presents itself, if at all, during convalescence and is not met with after the modern short loop operation.

Another cause of failure manifested by a return of symptoms after an interval of relief is the occurrence of a jejunal ulcer in the neighborhood of the anastomosis. It appears ordinarily within a few months or a year after the operation, and in the opinion of Dr. C. H. Mayo is due to the use of non-absorbable sutures.

It was never a common complication, and may perhaps be eliminated by the use of catgut instead of silk, but its influence cannot be wholly ignored in a consideration of the insurability of these cases as standard risks during at least the first year after operation. But after these dangers have been eliminated there is no reason apparent why the new drainage should not work as well as the old.

In the congenital pyloric stenosis of infants, where the problem is free from any pathological complications, the result seems to be uniformly successful. Scudder, who has had very large experience in these cases, in a personal communication, says: "That all of his patients who have survived the operation show a normal uncomplicated development, and one of them is now ten years old."

It would seem reasonable to infer therefore that those cases which are well at the end of one or perhaps two years after operation would thereafter present no impairment that could be directly attributable to the effect of the operation itself.

Lastly we have to consider the effect of the operation upon

the lesion for the relief of which it has been undertaken. Here is where we ought to have our table showing the mortality after five, ten, fifteen, and twenty years—and until these are forthcoming, we cannot accurately estimate the degree of impairment in these cases.

Meanwhile we must try to obtain from the clinical reports of end results all the data that we can bearing upon the insurability of these cases as standard risks.

In 1905, Mumford tabulated the end results in 147 cases of gastro-enterostomy performed for the relief of pyloric obstruction due to ulcer by different operators. These were the cases in which the immediate results were good, but in 25 or 17% of them, the end result is described as "bad."

These were of course early cases done before the indications for operations and its technique had been standardized; but they are certainly not encouraging from an insurance point of view.

In 1912, Moynihan reported his results in 186 cases of duodenal ulcer operated on between 1900 and 1911, the operative mortality was 2%; 6% were not heard from; 80% were cured; 2% died of other causes, and 10% were more or less improved. In other words, 12% were, from an insurance standpoint, unsatisfactory; and this is the more significant, because these were all duodenal ulcers which are admittedly more favorable than ulcers of the stomach.

This is illustrated by the figures published by Graham from the Mayo Clinic in 1913. Of 438 cases of duodenal ulcer, 88% are reported as cured or as having made satisfactory improvement; and of 162 cases of gastric ulcer, 80% only were regarded as cured.

These operations were all done from 1905 to 1911, and at least two years had elapsed at the time of the report. There were then 12% of duodenal, and 20% of gastric ulcers in which the clinical results were unsatisfactory, and the insurance risk therefore still more or less impaired.

The most recent figures are from the Roosevelt Hospital Clinic in New York, and were reported by Peck at the A. M. A.

meeting last June. Of the cases of duodenal ulcer the results in 88% of those heard from were good, and in 12% poor, while of the cases of gastric ulcer he says: "Our results in this series are much less favorable than in the duodenal group, and the series is too short and many of the cases too recent to make our deductions of much value."

The striking thing about these statistics is, it seems to me, their uniformity. When three widely separated clinics of the highest repute agree that in practically 12, 20% of the cases, the end results are unsatisfactory, there would seem to be little doubt as to what should be the attitude of a Medical Director who is trying to eliminate substandard risks.

It will be remembered that in studying the natural history of these chronic ulcers, we found that the two most prominent characteristics were a tendency to repeated recurrence of the symptoms of indigestion, and in the gastric ulcers a tendency to the development of cancer,—and these two characteristics appear with equal prominence in the unsatisfactory results after operative interference.

It is impossible from our present data to say just how great is the danger of a subsequent cancer, but that it cannot be disregarded, at least in the early years after operation, is evidenced by the fact that Mayo Robson in 1904 reported, that out of 112 cases of gastro-enterostomy for simple ulcer, four had died later of cancer; one at the end of one year, two at the end of two and one half years, and one after three and one half years; and that all had enjoyed good health between the operation and the development of the cancer symptoms. One of my own cases made a perfect recovery and for a year seemed to be in perfect health. Three months later he died of cancer of the stomach.

Peck says that "the well-known trend of gastric ulcers to undergo malignant degeneration, with the fact that a greater percentage fail to heal after simple gastro-enterostomy, has made me feel the desirability of excising such ulcers when it can be safely done," but of his two cases treated by excision without gastro-enterostomy, one returned three years later

with cachexia and probably cancer; and of his thirteen simple gastro-enterostomies, one developed cancer a year after the operation.

Gerster refers to the very good operative results, but calls attention to the number of clinical failures due to the development of cancer, and Lilienthal speaks of three cases in which carcinoma developed at the pylorus, years after the performance of gastro-enterostomy.

Rodman, who presented an exhaustive study of the subject to the American Surgical Association in 1914, concluded that after carefully reviewing the statistics furnished me, "I am impressed with three things; first, the operative mortality (which doesn't interest us), following gastro-enterostomy has not been less than 5%; second, the end results are frequently disappointing to the surgeon, and disastrous to the patient; and third, a number of perfectly satisfactory gastro-jejunostomies from an operative point of view, the patients remaining well for a year or longer after operation, were followed by malignant disease or death."

He believes that the ulcer-bearing area should be excised, and as I have already said; this opinion seems to be steadily gaining favor, especially in so far as it relates to gastric ulcers. Of course no statistics are yet available to prove its superiority over the simple drainage operation, but the mere fact of its increasing popularity is of importance to us because it indicates a growing dissatisfaction with the present results.

In this brief and very imperfect review of the operative results in cases of gastric and duodenal ulcer, it must be remembered that I have referred only to the opinions and results of men of the largest experience, familiar with the gross appearances of these lesions and possessed of every facility for accurate pathological diagnosis.

But the cases which are reported to the Medical Directors have not in many instances had the benefit of such expert attention or such careful study. At the hands of surgeons whose experience with these cases is small, whose opportunities for becoming familiar with their different phases are but few



and far between, and whose clinics do not have the facilities for accurate pathological investigation, the results will certainly be inferior to those which we have been studying, and our decisions as to the general insurability of these cases must be based on average results, not upon the results of selected operators.

No one can appreciate more than I how unsatisfactory from an insurance point of view is such a study of this problem as I have presented. It would have been so much more convincing to have been able to say that of 500 cases operated on in 1905 and discharged well, the mortality in the first year was 140—gradually diminishing each year until at the end of the fifth, it was only 100, and that after five years it was less than 100% of the tables—but unfortunately such statistics are not yet available.

In the meantime we cannot avoid the responsibility of a decision, and it must be made on the basis of such clinical studies as are now accessible, of which those which I have recited seem to me the most reliable and most illuminating.

From these it is I think a fair deduction that the surgical treatment of gastric and duodenal ulcer by gastro-enterostomy, though a distinct improvement over the older methods, in spite of the unquestioned brilliancy of its results, has not entirely removed the tendency to recurrence of symptoms and dangers in both lesions, and in the case of gastric ulcer has failed to eliminate the danger of subsequent cancer.

I hope that fuller end-results tables may in the future enable us to minimize if not entirely to overlook all of these dangers; but on the basis of our present knowledge my own conclusions are that a history of gastric or duodenal ulcer in an applicant for insurance constitutes a permanent impairment of the risk, an impairment that is less but not lost after the performance of a gastro-enterostomy, and that such applicants are not to be rated as average risks, insurable at standard rates.

Dr. A. H. Busby then presented the following paper on the Roentgenological side of the subject:



The actuary statistics of gastric ulcer is a tangible entity, as such, but the clinical statistics are extremely difficult to secure on account of the long-time interval which must elapse to make them of value. Time is a great healer but I do not feel that this applies to gastric ulcer as much as to many other diseases. The inflammatory reaction in gastric ulcer causes an induration to form in the greater number of cases which, when not resected, result in cicatricial formation in cases of apparent cure. We all know that time as a factor does not determine the possibility of malignant development or recurrence of ulcers.

Reliable diagnostic Roentgenology is said to date back to 1906. I do not doubt that this is true as far as securing good gastric Roentgenograms is concerned but is this true from the point of interpretation? As time goes on, we are able to check up the reading of the roentgenograms by the progress of the cases and the results of operations and the more that Roentgenologists learn in this way, the more it is realized that conservatism is an important factor. Then again, the technique has also gradually improved so that it makes a difficult question as to how long good Roentgenology has been available. Personally, I feel that for the past five or six years Roentgenology has been of material assistance in the diagnosis of ulcer.

As to the medical profession, I find that the general practitioner uses the X-ray in cases:

1. Where symptoms are general or vague and all assistance possible is needed in order to make a diagnosis.
2. Where the case is fairly definite but verification is wanted.

With surgeons X-ray is used in cases:

1. Where a differential diagnosis is of value between gastric trouble, gall-bladder involvement, renal or biliary calculus, appendicitis, etc.
2. Where a definite gastric finding is of value before operation.

Surgeons will frequently operate when the X-ray findings

are negative, as they realize that a negative stomach does not exclude ulcer.

Gastro-enterologists will employ the X-ray in cases:

1. That are difficult of diagnosis or confusing.
2. To check up their findings as far as possible.

I find that the general practitioner uses the X-ray in the smallest number of cases, the surgeons to a much greater extent, and the gastro-enterologists the most of all.

Roentgenologists consider the X-ray a valuable adjunct in gastric diagnosis. They realize the limitations in the work and that there is much to learn in the future. I think that you will appreciate that there is a conservative tone in Brewer and Coles's paper reporting the Roentgenological examination of 700 gastric cases in which they state that they are very hopeful of progress in stomach Roentgenography.

As to the value of the X-ray in gastric cases, there is a considerable difference of opinion, and I can give you a better idea of the situation by quoting a few of the men.

C. H. Peck says:

"Radiographic findings are becoming of more and more aid in the diagnosis of chronic ulcers both gastric and duodenal. In gastric ulcers especially, positive evidence is often obtained in cases where other signs and symptoms are very doubtful. Our records are too incomplete to attempt to tabulate the findings in this series but it is enough to say that all suspected cases are now examined in this way as a routine, and not only in many cases is the diagnosis definitely established, but our negative explorations are less frequently done than was the case before this valuable aid in diagnosis was available."

P. Eisen says: "A diagnosis should not be made from radiograms or fluoroscopy alone." He also states that "some authorities attach no importance whatever to X-ray findings in duodenal ulcer."

Kuttner states that "for the diagnosis of gastric ulcer the X-rays have been of unusual value."

Levy-Dorn & Ziegler make the statement that "the pres-

ence of a perfectly normal stomach does not exclude the possibility of ulcer."

C. D. Aaron cites a series of eight known cases in which diagnosis of gastric or duodenal ulcer was made after a careful X-ray examination and at operation there was no pathology of the stomach or duodenum. Nevertheless ulcers were present as no other cause for the symptoms could be ascertained and within a year the patients were operated on. The mistake arose from failure to make an exploratory gastrotomy.

The Roentgenological findings which would indicate gastric or duodenal ulcer must be persistent to a greater or less extent in all of the plates of the series. If there is a single plate which is actually normal, the case is considered negative or at least very doubtful, for spasm and reflex irritation must be very carefully considered.

Among the X-ray findings which are suspicious of gastric or duodenal ulcer are:

A distortion of the cap or duodenum or a persistent indentation in the outline of the same.

A persistently distorted or decentralized pylorus.

A niche or indentation in the outline of the stomach, and this usually occurs with an incisure or contraction in the opposite side of the stomach.

Pyloric obstruction.

Hyperperistalsis.

Hypermotility.

A slight nodule of bismuth or barium or small bulging in the outline of the stomach.

In perforating ulcer a streak of bismuth or barium may be seen, also a pocket, a small diverticulum, or a small bubble of air (McGavin).

Some of these findings are contributory to the evidence, others are more or less definite, but it must be remembered that many cases are found that are puzzling, difficult to interpret, and it is often impossible to make a diagnosis. In any case, the X-ray findings or report should be carefully con-

sidered by the attending physician or surgeon with all of the clinical and analytical data available.

A malignant condition at the pylorus is less apt to cause obstruction than a benign condition.

In regard to gastroenterostomy performed in cases of gastric or duodenal ulcers, Petien gives a list of 35 cases which were studied for long intervals, 19 of which reported excellent health and 16 still complained of having trouble. Of these cases:

8 were 5 to 10 years after operation;

13 were 3 to 5 years after; and

14 were 1½ to 3 years after operation.

On the other hand, Kuttner in writing of "Eleven Hundred Cases of Stomach Surgery in the Past Seven Years, 1914" while dwelling upon ulcer cases, says:

"Gastroenterostomy is the normal intervention, and subsequent investigations show the truth of this claim. Mortality is only 4% against 20% from resection. The end results of gastroenterostomy are excellent (65% complete recoveries and 20% improvements)."

The statistics giving the relative activity of the pylorus and the anastomosis are more or less unreliable, as many reports do not state whether only one examination was made or whether they were examined frequently during the evacuation of the stomach. The latter method I consider the only reliable one as the anastomosis may functionate first and the pylorus later, or *vice versa* and to a varying degree. Compiling several reports, I find out of 100 cases it is reported that the anastomosis was working alone in 77, the pylorus alone in 12, and both in 11. In my experience I have found a much larger proportion in which both the pylorus and anastomosis were working.

A Roentgenological examination for gastric or duodenal ulcer must be made in a thorough and complete manner or not at all. Many plates must be taken in order to see the same condition in each and also on account of the many abdominal conditions which by reflex irritation may distort the pylorus and stomach and which may cause pressure or ad-

hesions, *i. e.*, gall-bladder trouble, biliary or renal calculus, appendicitis, iliac stasis, etc. Many of these conditions may cause stomach symptoms.

My routine method is to have the patient purged the day before and an enema early the next morning, which is the day of the examination. The patient is allowed a light meal the night before, and after that nothing is to be taken in the stomach, not even water, when the case appears for examination the morning following. I first examine the kidneys, ureters, and gall-bladder region, then the opaque meal is given in artificial buttermilk. After a fluoroscopic inspection, I begin and expose plates up to the hour period which time will show any hypermotility if present. The patient is then instructed to take nothing by stomach and to return for the six-hour period when examination is made for gastric retention. After this I allow the patient to eat meals as usual and to return again in the evening for an examination at the twelve-hour period. This determines the intestinal motility, iliac stasis, etc. The case must return again the next morning for the twenty-four hour period, again the following morning for the forty-eight-hour period, and again the next morning for the seventy-two-hour period, and still again the following morning for the ninety-six-hour period. It may not be possible to determine the condition of the appendix before the ninety-six-hour period.

(Dr. Busby showed 46 slides showing various conditions—many of which had been verified by operation.)

#### DISCUSSION—GASTRIC ULCER

Dr. Schroeder—In accordance with the request of the President, my part in opening the discussion of the symposium on gastric ulcer will be strictly confined to the medical aspect of the subject. I am sure that all will join me in thanking the writers of these articles for bringing out so many valuable points in spite of the scarcity of available material dealing with the end results of the treatment of gastric ulcer.

The small percentages of cases recorded as under observation after five or six years is notable. The surgeon loses sight of them, and few companies have had the hardihood to assume these risks even on substandard rates until a longer period of time had elapsed. No statistical data will be of value in connection with the selection of standard or substandard risks until they are based upon the records of hundreds of cases extending from five to fifteen years from the date of the alleged cure. In the meantime the companies will not be in a position to discard the empirical method of selection followed at present, especially in non-surgical cases.

Another point is the doubt and error in diagnosis. A history of the classic signs of ulcer, namely: pain, tenderness, continued hyperacidity, vomiting, and hemorrhage, one or more of these being in combination with prolonged indigestion, makes the selection fairly easy. It is commonly granted, however, that indigestion, dyspepsia, gastric neurosis, hyperchlorhydria and other gastric disturbances are often due to the presence of an ulcer though the classic signs are absent, but it must be admitted that the reverse holds true in a large percentage of cases. The doubt is not lessened by the fact that both classes of patients improve or get well with and without appropriate treatment for ulcer, and the question often remains whether the improvement or cure is due to the spontaneous healing of an ulcer or to the abatement of some functional disturbance. My experience gained from eliciting information from examiners and attending physicians for the purpose of clearing up gastric disorders, justifies the belief that a comparatively low percentage may be attributed to the presence of ulcer.

Dr. William J. Mayo said, in an address to the American Life Convention on March 4, 1914, that in his opinion a large majority of individuals suffering from sudden hemorrhage of the stomach, who have not had symptoms of an ulcer preceding the hemorrhage and in whom the ordinary signs of ulcer do not follow the hemorrhage, have no ulcer. This statement, if accepted, compels a modification of the view that hemor-

rhage may be regarded as a conclusive sign of ulcer. Guess-work, then, must assume a prominent rôle in the selection of risks with a suspicious history pointing to gastric ulcer, when a positive diagnosis has not been arrived at through surgical interference. If Roentgenology is ever employed more commonly in the diagnosis of gastric troubles, the patients will have the means of furnishing better evidence as to whether ulcer was present or absent, when they apply later on for life insurance. This evidence, however, will not be final and decisive in non-surgical cases, since, as frequently happens in all tests, positive results may usually be regarded as reliable, whereas negative findings leave doubt. Roentgenological assistance may not be hoped for to much extent until X-ray stations are established under the charge of competent men, and with fees low enough to bring it into effective service.

The conclusions reached in these papers should not lead us to forget other clinical data which prove that everyone attacked by ulcer is not doomed later on to cancer of the stomach. Dr. J. C. Hemmeter (*Medical Record*, July 3, 1915) gives an interesting review of the "Transition of Gastric Ulcer into Carcinoma and of Gastric Carcinoma into Ulcer," which tends to demonstrate that (1) a gastric ulcer may develop from a pre-existing carcinoma; (2) a carcinoma may develop secondarily from a pre-existing gastric ulcer; (3) both carcinoma and gastric ulcer, or scar, may occur in the same stomach simultaneously. Dr. Hemmeter treated 232 cases medically from 1884 to 1910, all of them either re-examined by Dr. Hemmeter personally or by reliable physicians. Only three of this number gave a subsequent history of operation for cancer. In view of arguments and statistics given by other authorities and his own experience, Dr. Hemmeter is of the opinion what whilst ulcer of the stomach may be a possible cause of cancer, it is a rare cause.

Dr. William H. Chenery (*Jour. Am. Med. Asso.*, Oct. 9, 1915) gives a review of the literature of gastric ulcer as a sequel to gastric ulcer, in which the conclusions of Hemmeter are maintained by a number of continental surgeons. The



consensus of the opinions quoted, however, seems to establish the fact that gastric cancer originates from gastric ulcer much more frequently than was formerly supposed, though not by any means in all cases. Just how frequently the change takes place is far from settled, though a conservative estimate points to a percentage of about 50% of the cancer cases developing upon an ulcer base, considerably lower than the estimates of the Mayo and Moynihan clinics.

Dr. Porter—We are fortunate in having with us a man who has taken the place in the field of surgery in this city formerly held by Sands and by McBurney and by Bull. Dr. George D. Stewart has kindly consented to discuss the surgical side of this subject.

Dr. Stewart—Mr. Chairman and Gentlemen: Your Chairman's introduction was entirely undeserved. However, he is of a generous nature, as you have long ago discovered, particularly when he is arranging a menu, and on what other occasions I am unable to say, but I believe on all.

Now before saying a word in discussion, I would like to pay a tribute to the high quality of the papers that I have listened to. I had read Dr. Gage's paper in considerable detail, and Dr. Cook's more rapidly, but I listened to them both with great pleasure. They give me another point of view—a point of view I have never before had, and particularly is that true when they talk of a mortality of 320%! That is appalling to a general surgeon, you know—to lose three patients for every one operated and then 20% for good luck! It is a little difficult to understand, and discouraging indeed.

Instead of looking up statistics, instead of reading papers that have some of them been published periodically for the past nine years, at least once or twice a year, I thought it was a little bit better to look over my own cases, and to my dismay I discovered that most of the histories were in the hands of the binder, and I therefore must place myself in entire agreement with Dr. Cook, who says that the lack of subsequent



histories was appalling! We have them bound, you know, whether we have the end of them or not. It is very difficult to collect the final history, there is no doubt about that, but there is also no doubt in my mind that from your point of view and for your purposes a good deal longer time will have to elapse before you have very valuable statistics in the direction of prognosis, as I take it. However, I did stick to my own cases—I had the cases from one hospital for the last two years looked up. There were thirty cases of gastric and duodenal ulcer, and here is a very curious fact, showing how these will vary in different localities—in 30% of my cases there were perforations! I doubt if that would obtain anywhere outside of a very large city, where there are a great many people who are particularly careless about making observations on their own state of health. Perhaps this has no bearing upon the insurance question, but it seems to me it has, because in many of these cases the prior histories were very vague. And so, from my point of view as a general surgeon, it seems that a case with a gastric history should be very closely scanned by an insurance man. According to one of Dr. Cook's tables, a very large percentage of such cases with such history would either be gall-stones or gastric or duodenal ulcer—would it not?—and either of these are surely very important matters to look into, and if 30% of your cases are going to perforate, it rather emphasizes the importance.

Here is another curious thing: In the perforations that occurred nine were male patients, and one female, so that 90% of the perforations in my few cases were in the sex that is most likely to seek insurance,—I take it as correct that it is the men that get insured, although if the suffragists win at the polls at the next election, I hope for your sakes that there will be as many of them insured as there are men.

Another curious thing, *gastric* ulcer showed a much greater liability to perforation than duodenal ulcer. 50% of the gastric ulcers perforated, as against 20% of the duodenal. Of course the location was frequently near the pylorus and sometimes so near it that a direct classification, or a correct

one, was difficult. Of the duodenal perforations, every one recovered. Again, and I keep apologizing for the small numbers, of the gastric perforations, 33% died. All were treated in the same way, by suture and drainage, but they were received at varying times after the perforations occurred. When we got them with a fair degree of promptness they got well. That is not a new observation but it is one which may be repeated, and Deever within two years has written a paper in which he recommends not only closing up the opening, but doing a gastro-enterostomy on those perforated cases. Now a perforated case with a pretty extensive peritonitis has about enough infliction without having a gastro-enterostomy tacked to it as well, so that I am not quite willing to follow him in that. I would close it up and drain it, and if a gastro-enterostomy is needed I would prefer to wait.

The relation of cancer, it seems to me, is a very important thing. 71% of cancerous cases, according to Mayo, 72% according to Moynihan, show evidences of having begun in ulcer. There is another man who has written on that and who is a very close observer according to my opinion,—Patterson, of London,—and he has taken issue with that statement. His remarks were reported in one of the volumes of Murphy's clinics—I don't know where else they may be found—but he used these arguments: He said he did not believe that a cancer began in ulcer in so great a percentage of cases, and his arguments are at least worth thinking of. Of the statement that in 71% of cases of cancer there is a prior history of ulcer, he inquires very pertinently, what is a history of ulcer, and everyone here to-day has been admitting that they do not exactly know the answer to that question. As to the pathological evidence, he says it is based on the finding of a group of cancer cells in the edge of an ulcer,—he doubts that one can always tell that,—and inquires, how can one say when the malignant change began in the ulcer, and may it not have been there from the first, and cites a case of his own, in which he operated after a history of two years and found a mass which he diagnosed as cancer, did a gastro-enterostomy, proved

that the cancer was cancer by the microscope, proved that the portion of the stomach removed by the gastro-enterostomy contained cancerous cells, and yet seven years later the man was alive and in very fair condition.

Now I recall a case of my own, a relative of mine, a man who had a history almost of a lifetime, who was in the cancerous age. I excised a saddle-shaped ulcer from his lesser curvature, almost cutting his stomach in two. It looked like a cancer grossly, and taking the long history, the age, and the gross appearance, I felt very certain that it was one, and was so sure, as we sometimes are, that I gave a bad prognosis to have it utterly disproved by the microscope two days later, and by the fact that he has gone on living and in apparently good health, for years since.

Another argument of Patterson's is that cancer and ulcer may often co-exist. Now I confess that I have not seen that. He states it for a fact and of course inquires pertinently, which one would give the history—would it be the ulcer or the cancer? Another argument, and one I think is a pretty good one, is that we have established that duodenal ulcers are much more common than gastric ulcers, but nobody says and we none of us believe that duodenal ulcers ever become cancerous, and reasoning by analogy he says—why should we assume that gastric ulcers will? It is not a perfect argument, but it is like a good many of the arguments in medicine which have to be taken like revealed religion on faith, and not by logic alone.

A third point is with reference to the cures effected by gastro-enterostomies. These have been stated to be 88% by one, 87% by another. Now I believe that is very much too high. I do not believe that you cure 88% of your cases, or 87% according to Moynihan, by gastro-enterostomy or by any other surgical method. I am not able to prove this, it is mere conviction. I think that in getting such favorable results there is nothing so advantageous as to live remotely from your patient. Cure your patient and let him go home, a long, long way home, to annoy his family doctor for the rest

of his life; it will help in estimating the number of your cures! I have a case now in mind in which I did a gastro-enterostomy, occluded the pylorus for a duodenal ulcer. There was a recurrence of the symptoms that looked like jejunal ulcer, and I operated again, and found that the opening was patulous—there was never any vicious circle about it—and again I closed it up. It was not very long before the patient was back again, and this time I laid the whole thing open, took a look everywhere, and not a thing could I see. Again I closed it up, and again in final despair did a jejunostomy—and I think that the patient has now forgotten the symptoms. Now if I had lived only five or six thousand miles from that patient, I would have regarded her as a cured case, following her first operation. She weighed 70 pounds when she came to me, and 120 pounds when she went home. While I am of a gentle nature I could have wished very much that the good Lord would have seen fit to gather her in, and let me put it in the list of immediate mortalities! All of which leads me back to saying that I believe that 87% or 88% of cures is very much too favorable a result. I think, Mr. Chairman, that that is about all I want to say. One of my assistants, in looking over my cases, says that there is one absolutely constant symptom of ulcer, and just one, viz. constipation. Whether it is cause or effect I do not know, but I suspect it is effect, because we know perfectly well that no matter whether from reflex causes or what not, it must be at least a gastric stasis, and gastric stasis is after all a part or the beginning of constipation.

Dr. Porter—Before Dr. Stewart takes his seat, I would like to put a general question to him which I realize quite well cannot be perhaps accurately answered, but his opinion will be of value to us, I am sure; that is, as to the length of time that should elapse after one or more types of operation—if you wish to divide them—for gastric or duodenal ulcer. That is the point that we must decide practically from an insurance standpoint if we are to take these cases at all—how long after operative procedure would we be justified in assuming such cases as standard risks for insurance?

Dr. Stewart—You mean, before they could be regarded as cured?

Dr. Porter—Yes.

Dr. Stewart—Of course, I do not know, as I do not know what 320% mortality means, but I assume I know what a standard risk means. I recall a case of appendicitis that I almost operated on when I was a youngster, and I never saw the patient and he never had an attack again for twelve years. That was in a remote Nova Scotia town, and twelve years later, in New York, I got that appendix! Now would not most people have been justified in saying that the appendicitis was cured? Then, you know, gall-stones are often cured by such simple things as the abundant drinking of water, and are quiescent for ten, twenty, or thirty years. How would you explain that? If we will wait long enough, a few years more, and if we get together some more statistics, like these that Doctors Cook and Gage have brought here, we will be able to answer the question, I think, from your point of view, but I do not believe that until then we can do so, and you will have to do the best you can, keep on guessing until sufficient time lapses. It seems to me so. You know that people regard themselves as cured in much shorter time than we do, and they disappear. It's the other kind that keep on appearing.

Dr. Porter—Dr. Merchant has consented to open the Roentgenological side of the discussion.

Dr. Merchant—We were very fortunate in having Dr. Busby show us these fine plates. Those of us who have known Dr. Busby so many years know that he is a very careful, conscientious, and conservative man, so anything he tells you, you can add a plus to.

#### DISCUSSION BY DR. MERCHANT.

Those of us who have had close association with Dr. Busby for a good many years know that he is a very careful, conscientious, and conservative man, so that any statement that

he makes in regard to the use of X-ray for the determination of peptic ulcers may be received and regarded as trustworthy.

Since we understand that the X-ray for use in determination of gastric and duodenal ulcers has been perfected only since 1908, there is not much data on hand, but, as its use as a diagnostic measure is increasing, it is expected that within a reasonably short time there will be a large amount of data available.

The opinion of medical men, of surgeons, of enterologists and of Roentgenologists is that the X-ray is of value in the diagnosis of gastric and duodenal ulcers where no operation was done and it is also of value in determining the present condition after operation, and of value in differential diagnosis between peptic ulcer and other conditions such as adhesions, bands, or other abdominal conditions, giving symptoms simulating those of peptic ulcer. By the use of the X-ray, we may determine after operation the kind of operation done, whether the ulcer was excised or not, the site of the operation, and whether the pylorus was tied off. We may also determine the motility of the stomach, the movement of food current, and whether the vicious circle is present, and also whether there is any extensive thickening or other pathological condition.

If the X-ray is of value to diagnose ulcers and tell the condition after the operation and for differential diagnosis, it would seem that it should be of value in a certain number of cases to determine the insurability of an applicant. We may consider the disadvantages of its use and the advantages of its use for this purpose.

The arguments against the use of X-ray are:

(1) A certain percentage of cases in which the diagnosis is not made, or is doubtful. It seems that there are certain cases of acute ulcer in which the diagnosis is not made.

(2) Negative X-ray findings may not exclude the presence of ulcer.

(3) Expense. It would seem that it could hardly be considered possible to get accurate X-ray reading for this purpose

for less than \$75, for there are used in getting results from 18 to 30 plates.

(4) The difficulty in getting applicants to submit to test which involves some trouble and privation. The applicant has to go on an empty stomach and has to keep on going to the X-ray operator several times, as Dr. Busby has very well explained.

The arguments for the use of the X-ray are:

(1) The consensus of opinion is that the diagnosis can be made in a large number of cases.

(2) It shows the condition existing after the operation and in this way shows which are the favorable cases and which the unfavorable cases.

(3) It does in many cases, show the condition of thickening or other abnormality at the site of the operation.

As cases become more numerous where the X-ray is used for diagnostic purposes, it might be well to inquire in a suspicious case whether an X-ray has been taken and if so, to ask for the findings. It might be that this diagnostic measure would be of value in very large cases that have a suspicious history.

Dr. Porter—Dr. J. G. Wells will discuss the question from the medical standpoint.

Dr. Wells—Mr. President: In listening to these papers, this afternoon, it is rather discouraging and coming up before the Association as an internist makes me feel rather like a criminal coming before a society of judges. The question of ulcer is an old one. It is very important, in taking up this question, to decide where the ulcer is. Therefore the question has come down to one of diagnosis. Our statistics are at the present time of practically no value from an insurance standpoint, and the reason for that is, that the statistics as given by Dr. Cook have been on cases which are hospital cases to a large extent, and a great majority of those cases would not be accepted in any insurance company on a casual examination. They give a history dating back a great many years, and on that history alone they would be eliminated by the Examiner.



## DISCUSSION BY DR. J. GODFREY WELLS

Dr. Cook in his most interesting paper, which is the first effort of its kind as far as I have been able to ascertain, deserves great praise. It brings together a considerable group of cases both medical and surgical and removes as far as possible the two great branches of medicine from exaggeration. Naturally, both the internist and surgeon like to show that they obtain the best results and this will be true until they work more in accord.

Notice is drawn to the fact that it is only of comparatively recent date that we have been able to diagnose any but the typical cases of ulcer, and it is even more recent that we have made the effort to differentiate between gastric ulcer and that of the duodenum. It is for this reason that we have no reliable medical statistics at the present time, while the surgical statistics are fairly reliable.

It is essential in discussing the ulcer question to remember that ulcers occur much more frequently in the duodenum than in the stomach. The mortality of ulcer of the duodenum is much less than that of gastric ulcer. The situation of the duodenum, the relative sterility of the contents and the small size of the perforations, and the marked tendency to the formation of adhesions, account for the low mortality in the acute cases. The reverse of the above is true in gastric lesions.

Duodenal ulcers rarely lead to cancer, while those in the stomach are followed by malignancy in a considerable number of cases, whether treated medically or surgically, unless the ulcer is excised.

It is interesting to note, but of no practical use from an insurance point of view, that the Board of Health of New York reported 285 deaths last year as due to ulcer of the stomach, out of 74,803 deaths recorded. That is 3.81 deaths per thousand. There were no records kept of duodenal ulcers as they were so few that they were either classed with the gastric ulcers or deaths from other diseases of the stomach, other than cancer.



The above mentioned facts bring out two points of considerable interest from the insurance point of view.

First—That they are taking comparatively little risk when accepting a duodenal case that has been cured either medically or surgically.

Second—That the mortality of gastric ulcer is greater early in the disease and that there is a marked liability for these ulcers to become malignant, the figure being placed as high as 33% and as low as 5%. These figures I believe to be extreme in both directions.

These two facts show us the great care which must be taken to make a differential diagnosis between duodenal and gastric ulcer. The cases of chronic appendicitis diagnosed as gastric ulcer, account for approximately twelve per cent. of the unimproved medical cases; these cases, of course, properly diagnosed and treated, are good insurance risks.

From my own experience as a gastro-enterologist, I would make the following suggestions merely to open discussion and bring out individual opinions:

(a) A diagnosis as to the location of the ulcer should be required in all cases, either by a competent internist or Roentgenologist or both.

(b) No cases of gastric ulcer in applicants over thirty-five years of age to be accepted unless the ulcer has been excised.

(c) Applicants under thirty-five years of age with a gastric ulcer that has been cured for five years may be accepted on a plan maturing at age 45.

(d) No cases to be accepted that give a history of repeated attacks simulating gastric ulcer, until operated upon and the ulcer removed.

(e) No cases that have resorted to operation to be accepted unless the ulcer has been removed, as these cases are of the severer types.

(f) No operative case to be accepted until the patient has been free from symptoms for three years.

(g) A gastro-enterostomy for duodenal ulcer may be accepted if free from symptoms at the end of two years.

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(h) The above suggestions are made for those companies accepting impaired risks.

DISCUSSION.

Dr. Porter—We have with us a surgeon of great prominence from the Coast who has come these many miles to participate in this discussion, and as a Medical Director of experience, I am sure that he can throw a very great light upon this subject, and I take great pleasure in calling upon Dr. W. W. Beckett.

Dr. Beckett—Mr. President and Gentlemen: The remarks just made by your President will bear out what your eminent New York surgeon said a little while ago with reference to his generosity. In the first place I did not come on especially to discuss this subject although I have been highly edified along this line. I will not even refer to the notes that I have made because they have been so much better covered than I had covered them.

I think that two things have been brought out especially in these papers and in this discussion: One is that these lesions are of grave hazard to life insurance; and the other is that we have no data whatever on which we can base reliable statistics; in other words, as matters stand to-day it is practically guess-work and each Medical Department will have to act on the best information it can secure and use its judgment on each particular case that comes before it. Dr. Stewart cited a case in which he had operated for suspected malignancy and because of the fact that it did not return within a certain length of time he supposed that it was not malignant. A case occurred in my own practice where I removed the entire transverse colon for a malignant condition—carcinoma, verified by microscopic examination—contraction had become almost complete. That was seven years ago and he has had absolutely no symptoms since that time. A few weeks ago this gentleman who has since married spent the evening at my

home. However, if that man should apply to my company for insurance I surely would not recommend him.

Many cases at time of operation cannot be determined except by microscope as to whether or not they are malignant. I do not think that it makes very much difference whether the ulcer is duodenal or gastric, because the information we get with reference to our applicants is, as a rule, from the country doctor who does not have access to the X-ray, and if he did have access to the X-ray the mere fact that the applicant was in such condition that the X-ray would have to be used to determine whether or not he was a sick man would be sufficient evidence to postpone that man at least for two or three years before we would consider him—at least that is the way I would feel about it. Therefore, with all of these cases where there is a history of ulcer it has been my plan to postpone them and await developments, and even after a successful gastro-enterostomy or even the removal of the ulcer I am not sufficiently satisfied with the information that we have to say that that man is insurable within a year, or within two years or three years or five years. The statistics we have are compiled by only our very best surgeons. Thousands of average surgeons throughout the country are operating, whether or not they have made a diagnosis of ulcer, and expect to make the diagnosis after they have looked into the abdominal cavity. We do not know what their results are, but those of us who have had a practice largely sent to us by this class of men can well imagine just about what the end results will be. So when we take into consideration the meagre information we get with reference to these cases, and that the statistics we have you may say are not sufficient for any practical use, it makes me very skeptical about any of these cases with gastric or duodenal ulcer, and I think, as I said before, that we will simply have to bide our time and wait until we know more about the end results than we do now. We are gathering one kind of statistics and the surgeons and the medical men are gathering another kind. We are gathering statistics from the general class of people throughout the country; the doctors in active

practice are piling up statistics largely gathered from sick people, people who come to them who are ailing. Now, between both of us, in time, I believe that we will have statistics that will be of advantage to us, but at the present time I feel that we should go very cautiously with reference to accepting any of these applicants, and we will have to use the very best judgment that we have, eliciting the best information we can get with reference to the clinical symptoms, which often we do not get at all. Those of you who do surgery will recall many cases in which, with reference to certain points you were absolutely at a loss until after the operation, and then when you found certain conditions, you said to the patient, "Didn't you have so-and-so at such-and-such a time?" He answered: "Why, yes."—"Well, you told me you didn't."—"O, well, I had forgotten about it." Now, that is no uncommon experience, so that with a patient who intends to give a complete history and does not do so, we can well imagine about what kind of a history we get when the applicant is rather averse to giving a complete history. I think, therefore, that we will have to bide our time until we get more information before we can intelligently decide just which of these cases are insurable and which are not.

Dr. Porter—Mr. A. B. Neeb, who is connected with the Metropolitan Life Insurance Company in their X-ray work is with us, and I will ask him to be good enough to give us in as concise a manner as possible any suggestions that he may have as to how his work may be applied to this particular type of life insurance cases, enabling us to state whether or not through the help of the Roentgenologist we are warranted in accepting a risk as not having ulcer, not in the ulcer class, or, on the other hand, in a post-operative case, whether we would feel warranted in accepting it.

Mr. Neeb—In discussing the use of the X-ray in connection with a diagnosis of gastric ulcer, I believe it is your desire to learn whether or not the X-ray will be valuable in determining whether or not you may accept a risk on its evidence. Of course this afternoon you have heard excellent papers on gastric

ulcer, and Dr. Busby has shown a very fine set of pictures, but these are pictures on hospital cases, in which there is no question about accepting them as insurance risks. The cases in which we are the most interested are those where we have no history, or rather no definite hospital history. With reference to the X-ray, you have seen these pictures and you know how difficult it is to read the plates, or to get positive evidence from the plates. That must be done by an expert, one who is thoroughly competent to read. Then again, you will notice that Dr. Busby admitted in one or two cases that they were not absolutely certain, and could not be certain until the patient came to the operating table. That is very true. All of these plates present very positive evidence, but it is not certain enough for the X-ray operator to make definite statements.

Now in the first place, you must consider your access to X-ray examinations. Dr. Busby says that the patient came to him after starvation; bismuth meal was given, and serial pictures were taken over a course of two or three days. You will see how difficult that would be for you to carry out in connection with an insurance examination. Then these pictures were taken more for information in the surgical line. He also stated that unless the examination is very thoroughly made, it is useless. That is very true. So that your patient must be prepared, and then a very thorough examination made, not only single plates made but stereoscopic plates made. A single plate is very uncertain, and you will find on single plates that there are shadows interposed between your eye and the posterior aspect of the body, so that serial pictures are very necessary to remove anything that may look suspicious. A stereoscopic picture will eliminate that to a very great extent.

Then again, in acute ulcer, the one in which you are most interested, it is almost impossible—in fact there is hardly enough change in the gastric wall—for the X-ray to show it.

These examinations of course are quite expensive, and until the time comes when the expense of them can be reduced, I

imagine it is going to be of little assistance in the insurance way.

Dr. Porter—The only feasible way would be to have a man in the employment of the company to make such examinations when desired by the applicant.

Mr. Neeb—Yes, and even to-day, while the X-ray is of great value to the surgeon, many people who are deserving of this examination are unable to have it, because of the expense, but I sincerely hope and believe that some day there will be municipal X-ray laboratories, or laboratories that people may have access to at a very reasonable expense.

But there is another place where the X-ray is of greater value, I imagine, than in the gastric ulcer cases. This of course is not associated with this particular paper, but I should say that X-ray pictures or plates made of the chest would be of extreme value to you who are making examinations for insurance. Those plates are made easily and quickly and they present a wonderful lot of information that will be very valuable.

Now I do not wish to discourage the idea of using the X-ray in connection with gastric ulcer in insurance cases, but at the present time I feel as though some other arrangement must be made, some municipal or town laboratory, where you may have access to a very competent man to make these pictures and give you the information. I again come back to the fact that these cases upon which you want a positive diagnosis are the most difficult for him to answer. You will see that if the cases have gone far enough for surgical consideration, as Medical Directors they are entirely out of your range.

Dr. Porter—I am sorry that Dr. Whitney could not remain for the discussion. He has however expressed it as his opinion that in a general way cases of gastric ulcer can only be considered as substandard risks, and cannot at the present time be accepted with safety at standard rates. We are fortunate in having with us Dr. Eugene F. Russell, one of our new members, who has been good enough to look up the data of the Bellevue and Allied Hospitals. While the number of

cases he has been able to obtain is not large, it will make a valuable addition to those collected by Drs. Gage and Cook, and I will ask Dr. Russell to continue the discussion.

Dr. Russell—In continuing the discussion on the subject of peptic ulcer, I beg to submit for your consideration 75 consecutive cases of ulcer of stomach that I was able to investigate from the records of Bellevue Hospital. These were obtained for Dr. Cook, but the results were not arrived at in time to be included in his paper.

The average age at which ulcer occurred was 33.75 years. There were 22 female and 53 male cases—more than twice as many males as females—thus demonstrating the fallacy of the old idea that ulcer occurred more frequently in females than in males.

A loss of weight was noted in 16 cases, the amount of weight lost being from 7 to 40 pounds.

The cases not operated on were 49: symptoms persisted in 17 of these cases after discharge from hospital, or 34%. (Dr. Cook voices Mayo's opinion in the statement that there is little difference between medical cures and usual abatement of active symptoms.) There were 8 cases of perforated gastric ulcer, 4 of which died at time of operation. Of the remaining 4, 3 were cured and in 1 indigestion symptoms persisted. In 10 cases, gastro-enterostomy was performed: of these, 9 were cured and in 1 symptoms persisted after operation. There was 1 case operated on for hemorrhage, which resulted in death; 1 case of gastroplasty, cured; 1 excision case, cured; in 2 cases exploratory laparotomy was performed; in 3 cases, operation not stated.

Cases showing symptoms at time of diagnosis were:

Indigestion, pain, and vomiting.....	28
Indigestion and pain.....	7
Indigestion, pain, vomiting, and blood.....	31
Indigestion and vomiting.....	4
Indigestion, vomiting, and blood.....	5



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Cases where the history extended over five years.....	12
" " " " " from four to five years.....	7
" " " " " from three to four years.....	6
" " " " " from two to three years.....	5
" " " " " from one to two years.....	12
" with history within one year.....	33

The most frequent group of symptoms were indigestion and pain, and indigestion with vomiting. The next group were those included under ordinary indigestion. In a number of cases it was noted where the history of indigestion had occurred three to five years previous to entering the hospital, that either hemorrhage or vomiting occurred within the year and was the direct cause of the patient seeking medical attendance. In only one case did the patient enter the hospital for indigestion and that was where the history had existed over five years. This emphasizes the fact that where indigestion exists alone, the patient does not pay much attention to this symptom and only seeks medical attention when more alarming symptoms occur.

It has been impossible to follow up any of these cases operated on, after leaving the hospital. This seems to be the experience of most of the investigators who have attempted to obtain statistics from large municipal hospitals in the cities. It is for this reason that the problem of peptic ulcer, from a surgical standpoint, as Doctor Gage states, is far from being solved, and it is only by taking statistics from a few of the prominent surgeons who are connected with large private hospitals, that we are able to obtain any statistics as to the ultimate results of the operative treatment of peptic ulcers. The Mayos with their system have been the most successful and, consequently, their results are the most frequently quoted.

Dr. Cook has been very successful in getting together such a large amount of material and his results are the first tabulation, from an insurance standpoint, that I find in the literature.

Quoting Dr. Gage, Peck in the *Journal of A. M. A.*, of August 21, 1915, reports 134 patients operated on in Roosevelt



Hospital from January, 1910. Of these, he was able to follow up 58; 51, or 68.9%, were completely cured after two years; 5 improved, and 2 unimproved.

Sherren of London reports 85 out of 95 cases of chronic gastric ulcer in good health over two years.

Küttner reports 1100 cases in which gastro-enterostomy had been performed; 65% were cured.

Collison in the *Journal of A. M. A.*, of October 3, 1914, reports on 16 cases that he was able to follow; 65% were well.

Von Eiselsburg in *Surgery, Gynecology, and Obstetrics*, in November, 1914, gives 50% as the number of cases cured.

From this one will observe that the cures run from 50 to 70% of the cases. The reason for the difference in the number depends upon the type of ulcer found at time of operation. Gastro-enterostomy gives the best results and was performed in all of the preceding cases. The result of operation on those cases where the ulcer is situated at the pylorus, or first part of the duodenum, is very satisfactory. Where the ulcer is healed and stenosis of the pylorus is present, 60% of the cases are cured. In open ulcers, in cases where hemorrhage occurs, and in ulcers of the body of the stomach, or of the greater or lesser curvature, the percentage of cures is much smaller.

Von Eiselsburg reports only 34% of successes where the ulcer is at a distance from the pylorus. This he explains as being due to the lack of symptoms and non-recognition of the condition until the ulcer is far advanced. In cases where the ulcer recurs, the symptoms usually appear within three years and it is only very rarely that the symptoms appear later than three years. I have been unable to find any case where there has been a recurrence of the symptoms over five years.

The reasons for the symptoms following gastro-enterostomy are either a recurrence of the ulcer, formation of new ulcer, or cancer formation. New ulcers usually form at the gastro-enterostomy junction and usually take place within one year. According to statistics of the Mayo Clinics, there was only one case that occurred later and this was three years. The cause of these ulcers in 95% of the cases was due to the irritation

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caused by the retention of the silk sutures. They were characterized by all the symptoms of the first ulcer. In a few cases where the ulcer has not been removed, symptoms also recur. This takes place in the gastric ulcers where the ulcer is situated in the more active part of the stomach. A recrudescence in duodenal ulcer is not common. As Dr. Gage and Dr. Stewart say, Mayo states that cancer shows ulcer base in approximately 70% of cases. The average time that cancer occurs in ulcers that have not been removed at time of operation is two to five years. It would seem that cancer formation is usually prevented by removal of the ulcer.

It has been stated that in duodenal ulcer and ulcers of the pyloric end of the stomach where the symptoms persist, the causative factor is the continuation of the gastric stream over the ulcerated area, and in recent years it has been the practice of the operating surgeon to close off the pyloric end of the stomach.

From the foregoing it will be noted that ulcers are cured in 60% of cases. In the remaining 40%, 95% show symptoms within one year and the remaining 5% within five years. Therefore, it seems to me that in these cases of peptic ulcer of the pyloric end of stomach or duodenum where there have been an excision of the ulcer-bearing area, closing off the duodenum, and a well performed short loop gastro-enterostomy, and entire absence of symptoms from the date of operation, after a period of say five years, they might be acceptable upon ordinary rates with fairly good results.

This does not apply to ulcers of the body of the stomach or those on the greater or lesser curvature, for these are a much more serious proposition and only 34% are cured at operation; the remaining 66% show symptoms of recurrence and cancer formation in varying periods for a much longer time after operation.

Dr. Porter—Dr. Jaquith will continue the discussion of the surgical side of the question.

Dr. Jaquith—The discussion of this subject is very timely,

since, as Dr. Gage has stated, we are, with rapidly increasing frequency, called on to pass upon applications for insurance from men who have had gastro-enterostomy performed for relief of gastric or duodenal ulcer.

While it will be granted that the immediate good results of such an operation are gratifying both to the surgeon and his patient, still from an insurance viewpoint, we are interested in knowing what influence the changed condition will have on life expectancy.

Finney and Friedenwald, of Baltimore, in a paper read at the meeting of the American Gastroenterological Association, held in May, 1915, reported that the results of gastro-enterostomy for relief of gastric and duodenal ulcer were fairly satisfactory during the first year following the operation. Of a total of 100 cases, the final results of 19 were unknown, while 7 died soon after operation, leaving 74 cases. Of the 74 cases, 40 were males and 34 females and the ages ranged from 20 to 70 years, 26 being under 40 and 48 over 40.

They presented the following table showing the number of cases observed from 1 to 11 years after operation:

END RESULTS IN YEARS AFTER OPERATION OF  
GASTRO-ENTEROSTOMY.

Years	Total Number of Cases	Satisfactory Results	Unsatisfactory Results	Percentage of Satisfactory Recoveries
1	9	8	1	88.8
2	5	5	0	100.0
3	8	7	1	87.5
4	7	6	1	85.7
5	4	3	1	75.0
6	7	5	2	71.4
7	5	5	0	100.0
8	9	9	0	100.0
9	7	6	1	85.7
10	8	6	2	75.0
11	5	3	2	60.0
Average Percentage of Satisfactory Recoveries				84.2

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The results tabulated above, in my judgment, would not justify any other conclusion than that such a class of risks are substandard.

I recently interviewed Dr. Edward J. Ill, an eminent surgeon of Newark, N. J., on the subject of gastro-enterostomy and he authorized me to say that in an experience extending over a period of twenty years he had found that patients properly operated on for benign ulcer of stomach or duodenum got well and remained well. He also said it was very important that we know the operator and the character of his work. It may further interest you to know that Dr. Ill does not believe a benign growth ever becomes malignant. He is of the opinion that a malignant growth is malignant from the beginning, but would not say this applies to ulcerative conditions.

Because of the paucity of data for determining the effect of the impairment produced by an operation for gastro-enterostomy, the company with which I am connected has not knowingly granted insurance on lives belonging to this class.

Dr. Gage (closing the discussion)—I congratulate Dr. Cook upon bringing forward the first tables which bear upon this question from the standpoint that we are seeking. The only difficulty with them is that they cover too short a period, and in his cases that have gone over two years the mortality was still 185%, making them much too high to be considered as standard risks. I see no reason as the result of the discussion to change the opinion which I had that all cases giving a history of gastric or duodenal ulcer should be considered as strictly substandard risks.

Dr. Cook (closing the discussion)—There is only one point and that is that our figures do run for more than two years. There are a thousand cases that have been under observation for more than a year, and of these 138 have been under observation for more than five years.

Dr. Porter—I should like to have those of you who are here come over with me to the Bankers' Club,

who have invited us to be their guests. It will take only about fifteen minutes of your time, and we will then proceed uptown.

Motion was made and carried to adjourn.

## SECOND DAY.

Dr. Porter, President, in the chair.

The meeting was called to order, after which the balloting for the election of officers took place.

Dr. C. B. McCulloch read the following memorial on Dr. Allison Maxwell:

ALLISON MAXWELL.

Born 1848—Died 1915.

"So lived he, when his summons came to join  
The innumerable caravan, which moves  
To that mysterious realm, where each shall take  
His chamber in the silent halls of death,  
He went not like the quarry slave at night,  
Scourged to his dungeon, but, sustained and soothed  
By an unfaltering trust, approached his grave  
Like one who wraps the drapery of his couch  
About him, and lies down to pleasant dreams."

Such epitomized was the life and departure of a man who throughout his career remained steadfast and true to the high ideals of the luminous morning hours of his youth. Never, as the high noon of modern existence beat fiercely with its white and searching glare, did he falter in his steadfast devotion to that uprightness of thought and nobility of conduct which he had inherited from a long line of distinguished ancestry. And never, as the sun approached the western hori-

zon, did he manifest the querulousness and introspection concomitant on advancing years, but displayed rather the sweetness of character and courtly and courteous consideration of others which made association with him a privilege and an inspiration.

The name of Allison Maxwell is writ large on the Honor Scroll of his city and his State. Descended from a line of physicians famous for their attainments and beloved for their devotion and self sacrifice, his name adds luster to the lustrous list.

If it shall ever become the privilege of the members of this society to visit Bloomington, the seat of the University of the State of Indiana, they will see, facing as beautiful a campus as exists in this broad land, a noble pile of stone, an architectural tribute to the Maxwell name—MAXWELL HALL—in memory of the grandfather of our friend, and in proper succession did his father, and himself, and now his children after him, identify themselves actively and continuously with the University.

When as a younger man he entered upon the active practice of his calling in the capital city of the commonwealth, he maintained his old connections with the University and eventually was Dean, and finally Dean Emeritus, of the Faculty of the Medical School. His lectures were popular, his style convincing, and his knowledge broad.

In his professional life, during his years of activity of practice, he drew about him the best of the city; always busy, but always thorough. He thought no pains too great to undertake in the interests of those whom he served, regardless always, as a true physician should be, of any other side.

In his attitude toward his colleagues he rose above, head and shoulders above, the littlenesses of professional jealousies and bickerings. He acted and he spoke not only in even-handed justice, but in the utmost fullness of charity toward his fellow physicians.

Never, in many years of close association, did I hear an unkind word, or see evidence of a captious thought against

another. Four-square with his ideals was the record of his name.

In his death the company he served has sustained an irreparable loss. He assisted at its birth, he gave it continuous service and care for twenty years. Of a judicial temperament and an even and discriminatory habit of thought, he occupied with rare skill and suavity that difficult position between the Agency Department and the Finance Committee which a Medical Director is called upon to fill, and ever while the State Life Insurance Company maintains its existence and activity will his name be remembered with respect, veneration, and *love*—and always will his spirit be felt in their counsels, though his clay be under ground.

“And the stately ships go on  
To their haven under the hill,  
But O for the touch of a vanished hand  
And the sound of a voice that is still.”

Dr. F. C. Wells then read a paper entitled:

CONSERVATION WORK AS APPLIED TO LIFE  
INSURANCE.

Dr. Wells—Perhaps a word of explanation is in order in bringing this subject of “Conservation Work” before the Association, particularly as I have no large array of statistics to present upon which to pass conclusions, but I feel that this subject is one which is more and more finding an expression in many different lines of business, and is very applicable to that of life insurance.

CONSERVATION WORK AS APPLIED TO LIFE  
INSURANCE.

BY FRANKLIN C. WELLS, M.D.,

*Medical Director of the Equitable Life Assurance Society.*

If a life is of sufficient worth to an insurance company to assume it as a risk, it is fair to suppose that there is also an interest in the prolongation of that life.

The present physical soundness of a subject seeking insurance is important, but the prospect that he will continue sound through a given number of years, is equally important.

While actuarially we deal with classes, fundamentally we are dealing with individuals,—if the individuals are healthy and so continue, the "classes" will be safe.

The history of medicine is replete with changes which have been occurring from earliest times.

Then, little was known of the causation of disease; all that was sought for was some nostrum or method that would effect a cure. The idea of prevention was unknown, and although the same microbes and bacterium were in activity and in evidence, in those days, as now, it was the Pasteur School in France, and the School of Koch in Germany which gave to the scientific world the new idea, so tremendous and far-reaching in its effects, that there were specific causes for the diseases that were attacking men and animals. This idea was that a germ or microbe could reproduce itself, but that it might be destroyed or annihilated before manifesting its attendant symptoms and results in the human organism.

Metchnikoff foresaw this era when he gave expression to the view that, "the micro-organisms inhabiting our bodies have set going there a 'poison factory,' which cuts short our existence by secreting poisons that penetrate all of our tissues, injure our most precious organs, the arteries, brain, liver and kidneys. Man balked of his full term of life, feels himself unhappy and is ready to accept any solution to the problem of gaining happiness and health."



If then man is balked or deprived of his full term of life, the problem confronting him is not alone concerning the output, product, or resulting effects of the "poison factory," but the regulation, and closure of it before it does its work, with attention on the "in-put" as well as on the "out-put."

It is easier to retain health than to regain it, and the gauge of any civilization is the standard it sets for the health and morals of its people, and the effort it puts forth to surround them with sanitary safeguards, and health-prolonging measure.

No phase of this question is more important than the prevention of the so-called degenerative diseases, manifesting themselves at middle life and affecting the period of the greatest productivity.

For years the industrial system in this country seemed to bend its energies to the efficiency of the Corporation. Then followed a period of amalgamation of the Corporation for greater profit and efficiency.

To-day we are entering upon an era where the Corporation and the industrial and commercial world are beginning to realize that efficiency in its truest sense must begin with the conservation of the health and strength of the individual, and they are placing a higher estimate upon the value of the human machine, realizing that a man is greater than a mill, the producer more important than the product, and that what injures the man will injure the machinery.

In all of this the Life Insurance Companies may well have a share, in endeavoring to conserve and prolong the lives of those with whom they come most closely into relationship, and through them those dependent upon them.

What protects the breadwinner, will protect the bread-consumer, what safeguards the home, will likewise safeguard those under its roof. Measures intended to prolong the life of the provider of income, education and life's necessities, must also benefit those immediately dependent thereupon.

But from a more personal and even selfish viewpoint, the prolongation of the life of the individual policyholder, will

add revenue to the company itself. Dimes thus expended may return in dollars to its tills.

In the case of a company which pays \$20,000,000 a year in death losses, the prolongation of the life of each policyholder for one year beyond their present duration would have the following annual financial effect. The company would save one year's interest on \$20,000,000, which at  $4\frac{1}{2}\%$  amounts to \$900,000. One additional year's premiums would be paid in each case, which we can consider after deducting a year's dividend and commissions, as averaging \$25. per thousand and amounting to \$500,000 for the year. We, therefore, see that the total annual savings would be approximately \$1,400,000. This sum is 7% of the company's gross mortality loss, or from 10 to 15% of the company's net mortality loss. This percentage, 10 to 15%, is more significant, as the net mortality loss shows the money paid out in excess of the reserves already accumulated on the policies involved. Looking at it from another point of view, the saving effected would probably equal one third to one half the gain from loading on participating premiums over expenses. All of this may be termed commercial selfishness, but if so it is an enlightened selfishness for it benefits "him who gives, as well as him who receives."

Some Life Insurance Companies are beginning to realize this fact, and are placing in operation, and within the reach of the policyholder, means and measures for the early detection of disease, and pointing out a warning that the "poison factory" in the body is working overtime, and that the wheels should be slowed down or stopped. In all of this the Company, that I have the honor to be associated with, is having a modest part, and endeavoring to contribute its portion to this end.

In July, 1914, we placed before our body of policyholders, the opportunity, accompanied with an invitation, to avail themselves of a free medical examination, for the purpose of detecting and bringing to light, any impairment or insidious physical impairment, not openly manifest. This examination was made without prejudice to the insurance record of

the party applying, the papers being entirely destroyed after a certain length of time.

We have been studying the problem, as well as feeling our way, and up to a recent date had accumulated records of 2032 full health examinations and 1178 urinary only examinations, the latter form consisting of a certain number of questions bearing on the health record, and a careful laboratory examination of the urine.

While these figures are not large, they furnish an interesting as well as instructive study. In observing the following tables, showing the relative frequency of impaired and unimpaired risks, it must be considered that many, and perhaps the majority of these policyholders who availed themselves of a full physical examination, did so because they felt that their health was not of the very best, or, at least, were suspicious of some physical impairment. This is, no doubt, the explanation of the high percentage of impaired lives.

The following table of full health examinations is interesting as showing somewhat the distribution by ages of impairments as follows:

	Ages to 29		30 to 39		40 to 49		50 to 59		60 and over		All Ages	
Impairments noted by examiner . . . . .	132	62%	312	65%	415	66%	300	70%	242	86%	1401	69%
Ailment noted by insured only . . . . .	34	16%	106	22%	130	20%	84	20%	26	9%	380	19%
No impairments noted . . . . .	47	22%	61	13%	88	14%	42	10%	13	5%	251	12%
	213	100%	479	100%	633	100%	426	100%	281	100%	2032	100%

As might be assumed, the highest ratio (22%) of unimpaired risks is among the youngest, the lowest ratio (5%) among those of 60 years old or older. Likewise, among the young it is to be found the lowest ratio of impaired risks (62%) as against 86% for those 60 years old or older. From 16 to 26%

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of the policyholders put certain impairments in their examination blanks which Medical Examiner did not consider serious enough to note.

Relative to the nature of the impairments and to their number, we have listed the cases in accordance with the most serious ones that were found. Excluding the 76 insured who were 70 years old or older, we found that the most serious impairment affected the

Circulatory system in.....	493	cases	or	24%
Genito-urinary system in.....	410	"	"	20%
Pulmonary system in.....	79	"	"	4%
Digestive system in.....	133	"	"	7%
Nervous system in.....	83	"	"	4%
Miscellaneous.....	127	"	"	6%
Entirely without impairments.....	251	"	"	12%
* Minor impairments of little or no importance.....	380	"	"	19%
Old Age cases (70 to 85 years old).....	76	"	"	4%
	<hr/>			
	2032			100%

In the majority of cases the impaired condition is caused not by one, but by several ailments of importance.

Regarding the 798 examinations, without impairments, 522 policyholders mentioned other impairments of more or less seriousness, as the blanks which the insured fill out ask many questions.

While all of this is an experimental state, it nevertheless goes to show the frequency of impairments in adult life—and during the “insurance age”—and instances might be cited to show the apparent beneficial result to those who by our examination, had had their attention called to the necessity for immediate medical attention and received benefit thereby.

These few suggestions are offered merely to bring to your attention a subject that I believe will more and more receive consideration—and form a part of legitimate life insurance work.

\* Such as occasional headaches, poor eyesight, slight indigestion, occasional dizziness, etc., etc.

Dr. Porter—I feel that we are indebted to Dr. Wells for this paper. The wisdom of taking up work of this character is certainly an open question still in the minds of companies generally, and I regret to say that I have just had a telephone message from Dr. Willard to the effect that two of his assistants have been put out of commission, and with Dr. Knight away, he will be unable to be here to open this discussion now, but will contribute to the subject later on, as soon as he can get down here. I am sorry to say that Dr. Toulmin is detained at home on account of illness. Dr. Cook expressed a desire to discuss this subject at the outset, but not receiving a copy of the galley-proof he concluded that he was not to do so. As a matter of fact I had hoped that he would go on with it, but he has made his apologies in that he had not prepared a discussion. Certainly this question is of such importance that I hope we may hear from a number of gentlemen as to their views, and if they so desire I am sure Dr. Wells will be glad to answer any questions which might be put by them, tending to help them settle or decide the advisability of taking up work of this character. I will be very glad to hear from anyone who will discuss this paper.

#### DISCUSSION.

Dr. Porter—Dr. Dwight, have you any remarks or any questions to ask Dr. Wells, which might be of assistance to us all in determining the wisdom of this course?

Dr. Dwight—Mr. President and Gentlemen: I should much prefer to be asked to discuss almost any other subject. It is an important subject. It is a subject upon which we differ among ourselves, and the reasons for such differences of opinion vary. Some of them are questions which I do not feel it proper to open at this time. I should want to know a whole lot more about it than I do before I felt qualified to raise any serious question. There is, however, one question which I should like to ask, and perhaps in answering it Dr. Wells can answer one of the criticisms which has been so frequently

made—whether it amounts to anything I do not know. It has been said by men who were opposed to this work for a life insurance company that a very large percentage of those who applied for free examinations to life insurance companies did so, not in order that they might learn as to whether or not they were in good health from the point of view of conservation, but in order that they might check up, at no expense to themselves, the work of the medical men under whose care they were at that time, in other words, that a man already under treatment by a regular practitioner might think he saw an opportunity to get the advice of a recognized man at no expense to himself. If that is responsible for many of these examinations, it would of course diminish the value of the work as a life-saving agent. I should prefer not to go very far with the subject, but I should like to know whether Dr. Wells has any method of ascertaining what percentage come for the purpose for which the opportunity is offered, and what percentage of them come for the reason I have stated or for other kindred reasons.

Dr. Ward—I should like to ask the doctor whether I understand him to say that the impairments which are found in these health examinations are not used with reference to the future insurability of the applicant. In other words, that even if serious impairments are found, they are entirely disregarded if application is made in the future for insurance.

Dr. Phelps—I should like to ask a question which is perhaps superfluous—impairments found in these health examinations are not reported to the Bureau, I assume.

Dr. Muhlberg—May I ask Dr. Wells what percentage of the policy-holders to whom this privilege has been extended have responded by submitting either to a full examination or to a urinalysis? I may state that the Union Central at the present time is encouraging its policy-holders to submit annually a sample of urine for examination at the Home Office, together with a brief statement with reference to the condition of health within the past few years. We have been very much encouraged by the response. We have found that about 12%

of them so far have sent in samples, and of those 12% who have sent in samples, we found about 10% where the specimens contained either albumin, sugar or casts, blood or pus. I think perhaps this method is not open, at least so seriously, to the objection that Dr. Dwight has mentioned, that the policy-holder is using it as a check against the diagnosis which his family physician has made. I may further state that, judging from the letters which we receive from our policy-holders, they seem very well satisfied with our method.

Dr. Porter—Dr. Fisher asks whether the Medical Director of any company present is using this, or similar methods at the present time. If so we should be glad to hear from any of you gentlemen.

Dr. Patton—Dr. Wells says that about 20% of these cases show serious urinary impairments; and about 32% show urinary impairments of some type. I wonder how near that comes to the showing of regular applicants with reference to urinary impairments.

Dr. Porter—The criticism has been made by some that the very fact of the insured being advised of their impairments would in a certain percentage of cases hasten the unfortunate end, through apprehension and the depression resulting from that knowledge. I wonder whether any of the doctor's data on death claims coming along subsequent to sending out these notices would bear that out at all. I know it is an impression that has gained a pretty good foothold—that the applicant is scared to death. How much it hastens the death of applicants I cannot tell you; perhaps the treatment received may offset that extra hazard to such an extent it may not be apparent in the result, but perhaps the doctor can advise us as to his percentage of claims among the class to which he has referred. If we have no further remarks I will ask Dr. Wells to answer the questions which have been put to him.

Dr. Wells—I am very glad that this paper has given rise to some discussion and some new thoughts, in connection with it.

With regard to the first question that was asked by Dr.



Dwight, as to the free medical examination being used by applicants to check up their regular family physician, I presume that in some instances this may be done—in my opinion there would be no objection to it. I have heard of people making regular application to a life insurance company, having a full medical examination made and for that purpose, independent of any free health service that might be offered. We have all heard of cases which have been examined by the family physician, and receiving an unfavorable opinion have gone to another physician to be checked up. I can see no possible harm in so doing, but on the contrary rather an advantage. If an applicant desires to avail himself of a health examination, or of a regular application for life insurance, even though he may be declined, and all in order to determine the reliability or accuracy of his family physician, who, perhaps, lives somewhere in the country, I can see no objection thereto or way to prevent it. As a matter of fact, we have never had that question raised, and I am not aware of any experience in our company with a similar case.

With reference to the point presented by Dr. Ward—these medical examinations are made in good faith, and simply for the purpose of placing within the reach of the policy-holder the opportunity to ascertain whether or not he has a beginning physical impairment, that may be apparent, and to warn him accordingly. If we make that offer it is no more than right that we also keep faith and we do not regard it as an insurance record, nor do we report it, because it is an absolutely separate and independent transaction, and not for the purpose of insurance.

Regarding the percentage of cases who have responded to this offer, it is small I must admit, as the system has not been in operation a great while. The Metropolitan, I believe, have had more experience than we have. We have not, as yet, passed even the experimental stage, and as I stated at the outset, our figures are small, but they do show there is a certain percentage of people who are interested in their health and are availing themselves of this opportunity to determine



their physical condition. I do not know just the percentage, since this report applies only to our first year. Since the completion of that first year, the number is increasing. They are responding more readily than they did previously.

With regard to the urinary impairments found, I do not know just how these would tally in percentage with those found in the regular cases. I think they will run very nearly the same. I should expect a larger percentage of urinary impairments with the free health examinations, because they are made among a body of policy-holders who have had their policies for years, and who have, perhaps, passed into the age when they are deteriorating, and we would expect therefore to find a larger number of urinary and other impairments than among the younger entrants, or those perhaps making application for the first time.

One other question has been brought out, that of the possible depressing effect upon an applicant in advising him of his true condition. I presume that to some extent this may be so. I once heard of a man who was advised suddenly that his house was on fire, and who very promptly fainted! I do not know how far that affected the situation, but I do not believe that it was any the less the duty of those around to inform him of the danger for the possible reason that he might faint or pass into a sudden state of syncope. I think that such an objection would come largely from physicians. Only yesterday one of the members of this Association informed me that he had never had his heart examined and would not do so because he feared knowing its true condition, and I think that most physicians fear a physical examination for themselves. Now, if a physician should not inform his patient that there is an element of ill-health in connection with his case, if you are not to warn your neighbor that the building he is in is on fire in order that he may take means to escape, then your point is well taken. I believe, however, that it is the duty of a physician, if he finds that there is danger or disease, either incipient or advanced, to notify the patient in a common-sense, tactful way, that measures may be at once

instituted to arrest its progress—he owes it to his client, and I believe that we owe it as well to our body of policy-holders.

Dr. J. Bergen Ogden then read a paper entitled:

A STUDY OF 59,270 EXPOSURES OF ORDINARY LIFE  
INSURANCE SHOWING URINARY IMPAIR-  
MENTS AT THE TIME OF ACCEPTANCE<sup>1</sup>

BY J. BERGEN OGDEN, M.D.,

*Assistant Medical Director of the Metropolitan Life Insurance  
Company of New York.*

Some twenty-four years ago the writer, while engaged in research work, was forcibly impressed with the fact that many individuals who applied for insurance on their lives were unable to obtain policies because of some abnormality in their urine. No small number of these people went to their physicians or to medical chemists and analysts to find out the real reason for being declined insurance. In this way I came into close touch with those who at the time or at some previous time, had been the subjects of abnormal urine. It was not uncommon to find in these cases evidences of extensive kidney disease, a diabetes mellitus or some disease of the urinary tract which had been unsuspected up to the time application was made. But it also not infrequently happened that some of these unfortunate individuals presented evidence of disturbance in the urinary tract which entirely disappeared within a short period. Subsequent experience with cases of this kind led me to believe that at least some of those who had been declined were entitled to insurance protection because they were not really diseased, but merely temporarily disturbed.

It was not many years ago, that insurance was refused any person whose urine contained albumin or sugar, or when the specific gravity was uncommonly high or unusually low, or when the reaction was alkaline. To-day these abnormal, or

<sup>1</sup> A paper read before The Association of Life Insurance Medical Directors of America, October 15, 1915.

unusual features of the urine are looked upon by many of us merely with suspicion and, by means of thorough chemical and microscopical investigation and study, a fairly correct translation of their significance can be made.

It is, therefore, with great pleasure that I am to-day able to present to this Association the results of a study of 59,270 insurance exposures covering a period of about ten years.

It may interest you to know something of the manner of collecting the data which will be presented.

The laboratory of the Metropolitan Life Insurance Company was created in July, 1905. It was deemed advisable at that time to make thorough and systematic chemical and microscopical analyses of the urine, for the purpose of selecting those individuals for insurance risks who presented relatively unimportant disturbances in the urinary tract, and at the same time eliminate those cases which showed well-marked pathological conditions in the urinary system. The *modus operandi* of investigating the urine adopted in 1905 has been in use ever since.

Specimens of urine are sent to the Home Office by first-class mail from all parts of the United States and Canada. The examiners in the field are requested to mail a specimen of urine in every instance where they find either albumin or sugar, where the specific gravity is above 1030 or below 1012, where the history or circumstances suggest the advisability, and when the policy applied for plus that already carried in this Company amounts to \$10,000 or more. In addition to specimens received under these circumstances, the Home Office frequently requests the examiner to send samples because of a personal history or a suspicion of some trouble in the urinary tract.

The methods of urinary analysis used by the examiner in the field are those adopted by this Association in 1908, and the same methods are in use in our Home Office laboratory, although our laboratory investigation of the urine is much more extensive than that made in the field by the Medical Examiner.

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Chart I will serve to show the nature of our laboratory study of the urine, and every specimen coming to our Home Office receives exactly the same analysis.

### CHART I.

Name.....	District.....		
No.....	Date.....	Dr.....	
Color =	Transp. =	U. =	%
React. =	Sp. Gr. =	U. =	
Ind. =	Amt. of Sed. =	Cl. =	
Albumin =		Acetone =	
Bile Pigments =		Diacetic Acid =	
Sugar =			
Sediment =			
Recommendation:			
Accepted	Postponed	Rejected	

The color, reaction, and transparency are noted, the relative amounts of uric acid and chlorides determined, the percentage of urea obtained, and the tests for albumin, sugar, bile pigments, acetone, and diacetic acid are made. The sediment is examined in every instance, except in those urines which contain a large quantity of sugar, and in rare instances where the amount of albumin is very large and the case is obviously so bad that we do not deem it necessary to complete the examination.

Since the microscopic examination of the urine constitutes perhaps the most valuable part of a urinary analysis, it may be of interest to know just how these examinations are conducted in our laboratory. The urinary sediment is obtained by centrifugalizing 15 c.c. of the urine which has first been thoroughly agitated. If upon examination a satisfactory sediment is not obtained in this way, the urine is allowed to settle for several hours by gravity and the deposit thus obtained is thoroughly centrifugalized. One or more microscopic preparations are then made and examined. No specified time is

given to the microscopic examination. Some sediments are examined quickly while others require a much longer time, but since all microscopic examinations are made by trained assistants, much must be left to the judgment of the microscopist as to the time to be spent on any given sediment. Roughly speaking, an average of six to eight sediments per hour is about the number which can be satisfactorily examined by one person.

Of all of the cases in which the urine is sent to the laboratory of the Metropolitan Life Insurance Co., because either the Medical Examiner found at the time of his examination the abnormal features or there was a history or a suspicion of trouble in the urinary tract at some previous time, approximately 68% are recommended for insurance on the regular plans. If we include those cases in which the examiner sends the urine to the Home Office laboratory because of the amount of insurance—\$10,000 or more—and in which his examination of the urine is negative, approximately 71% are favorably recommended for insurance on the regular plans. The cases under consideration to-day are those that were thus recommended by the writer and finally accepted as suitable risks.

For the purpose of analyzing the 59,270 exposures, we have divided them into ten groups according to the urinary impairments found, at the time of acceptance, by the chemical and microscopical examinations of the urine, and we shall consider each impairment, giving the figures which have been very carefully prepared by the Actuarial Division of the Metropolitan Life Insurance Company. The impairments are numbered from 1 to 11, omitting number 10 in which no data are yet available. No *substandard* or *special class* cases are included in these figures and groups, but only those accepted on some of the regular plans of Ordinary policies issued by the Company.

The period of time covered by this study is practically ten years. Our records, however, antedate the opening of the laboratory because of a few revival cases which carry the dates

of issue back to 1904, and then through the succeeding years to and including 1913. All exposures are taken to their anniversary date in 1914.

We shall take up the different impairments giving the exposures by number and by amount of insurance involved, the probable claims computed on the American Experience and on the Compound Progressive tables, the actual claims by number and amount of insurance, and finally the percentages of actual claims to the probable on both tables. It will be obvious that our final basis of calculation is therefore reduced to percentages.

**GROUP 1. Slightest possible trace of albumin. Relatively normal solids. (1.5% to 2.5% urea.) Rarely a cast (hyaline or granular), renal cell and abnormal blood globule.**

This group of cases represents a very mild renal disturbance which we term a mild renal congestion or active hyperemia, and not true kidney disease. These are the cases which have been the terror of the insurance world and considered by some as extra hazardous; others have believed that they were suitable for policies only on a substandard plan.

Practically all of the cases accepted in this group were comparatively young people, under 40 years of age, with a first-class history in every other respect. The amount of insurance applied for and given was usually small, varying from \$1000 to \$2000 and in very few were blood pressures taken. We have looked upon the kidney disturbance in these cases as a transitory condition likely to last only a few days and then entirely disappear. It is reasonable to believe that temporary derangement is as likely to occur in the kidney as in any other organ of the body, and without affecting longevity. To be sure, the important feature of these cases is to distinguish them from those showing renal disease in its early stages, and this is not always an easy matter with the limited means of investigation at our command.

In this group there are 5,546 exposures involving \$8,154,400 insurance. The probable claims amount to 58+ in number

and \$87,645 in amount calculated on the American Experience table, and 40.7+ in number and \$62,135 in amount on the Compound Progressive table. The actual claims were 31 in number and \$41,200 in amount, giving us 53% by number and 47% by amount on the American, and 76% by number and 66% by amount on the Compound Progressive tables.

By referring to Table XVIII, we find that, of the 31 claims, only ten causes of death have a direct or indirect connection with the kidneys. There were two deaths from Paralysis, five from Organic Heart Disease, one from Embolism or Thrombosis, and three from Nephritis or Bright's Disease.

**GROUP 2. Slightest possible trace of albumin. Relatively normal solids. Excess of leucocytes and urethral or neck of bladder cells. Some squamous epithelium. Rare or occasional blood globule. No casts found.**

The condition represented by these findings is one of a slight irritation in the urinary tract below the kidneys and ureters. The source of the slight irritation or congestion is shown by the cellular elements found in the microscopic examination of the urinary sediment. The disturbance may be in the bladder, at the neck of the bladder, in the prostatic urethra, the urethra proper, or in the prepuce. In the great majority of instances the irritation is in the urethra and at the neck of the bladder. Occasionally there is a slight disturbance in the bladder and not infrequently a long prepuce with lack of proper cleanliness is the source of the elements found in the sediment. Apparently the most frequent cause of this slight irritation in the urethra and prostatic region is a preëxisting gonorrhœa which has left a small area which has never fully recovered. Sometimes fine urethral shreds are found which no doubt come from slightly inflamed folds of the mucus surface of the urethra. Cases of this sort must not be confused with those of urethral stricture in which there is usually a pocket of pus behind the constriction in the urethra.

In this group are also included female risks in which the urine almost always shows a greater or smaller number of



elements from the genital tract and genitalia. Naturally, in the female, there may also be slight disturbances in the bladder and urethra.

We look upon the conditions in this group as relatively unimportant and in no way affecting longevity. This group is a large one for the condition is very common. The number of exposures is 23,061 involving \$76,567,900 of insurance. The probable claims are 227.5+ in number and \$823,210 in amount on the American Table and 146+ in number and \$541,728 in amount on the Compound Progressive Table. The actual claims were 94 in number and \$300,900 in amount, making 41% by number and 37% by amount on the American, and 64% by number and 56% by amount on the Compound Progressive Tables.

In Table XVIII, it will be seen that of the 94 death claims, only a comparatively few causes of death were directly or indirectly connected with the urinary tract. We find one death from Alcoholism, one from Chronic Lead Poisoning, one from other Chronic Poisoning, three from Cerebral Hemorrhage or Apoplexy, one from Paralysis, one from Pericarditis or acute Endocarditis, four from Organic Heart Disease, one from Angina Pectoris, one from Embolism or Thrombosis, and four from Nephritis or Bright's Disease.

**GROUP 3. No albumin detected. Relatively normal solids. Rarely a hyaline or granular cast, renal cell, and blood globule.**

In this group the urine was found to be free from albumin, the solids were relatively normal, but in the sediment were found rarely a hyaline or granular cast, renal cell, and blood globule. In other words, there was evidence of a slight disturbance of the kidneys, but without any trace of albumin and without evidence of disturbance in other parts of the urinary tract. There is, in this group, a striking similarity to Group 1 except for the absence of albumin. Practically all of the risks were under 40 years of age, and invariably with a first-class history in every other respect. Because of the care in



selection, and the relative infrequency of finding casts in the urine without albumin, the number of cases in this group is small and perhaps too small to give us a good idea of the true mortality, but the figures are submitted for what they are worth. I might add that these risks were taken with the conviction that there was not true renal disease present, but that our findings in the urine represented only a very slight temporary renal irritation or congestion which was not of importance as affecting longevity.

The number of exposures is 503, involving \$1,025,400 of insurance. The number of probable claims is calculated as 5.3+ in number and \$12,346 in amount on the American Table and 3.7+ in number and \$9,155 in amount on the Compound Progressive Table. There was only one \$1000 claim giving 19% by number and 8% by amount on the American table and 27% by number and 11% by amount on the Compound Progressive Table.

The reported cause of death of the single claim in this group was Pneumonia. (Table XVIII.)

**GROUP 4. No albumin. Low specific gravity (1012 or less). Relatively low urea (1.5% or less). No casts or other morphological elements detected.**

One of the most perplexing group of cases in judging of the fitness of applicants for insurance is that showing persistently low specific gravity (below 1012) and a low percentage of urea, below 1.5%. In this group we have the low solids without albumin or sugar and without abnormal elements in the sediment. With a specific gravity below 1012 and a correspondingly low percentage of urea, 1.5% or less, there immediately arises the question of a cause. We know that the nervous excitement attendant on the physical examination of the applicant for insurance is nearly always present and this constitutes a common cause of a low specific gravity of the urine—a nervous hydruria. It is, therefore, always advisable to procure a specimen of urine from the applicant, if possible, before the physical examination is begun rather than to

wait until the examination has been completed, as is the rule.

Another common cause of low solids is the ingestion of an unusual amount of water, beer, or other fluid. It is not uncommon for the laboring man to stop at a saloon on his way from the shop to have a glass of beer or to have beer with his meals, and usually the urine collected shortly after will have a low specific gravity.

Still another cause of low solids is a chronic interstitial nephritis, and right here lies the great importance of the condition from an insurance standpoint. We all know how very difficult it is to detect albumin and renal casts in a very dilute urine, and the possibility of dealing with an interstitial nephritis is, therefore, apparent.

It has been our effort to determine in every instance the cause of the low specific gravity if possible. We make repeated examinations of the urine, and ask the help of the Medical Examiner in the field to get at the cause and to obtain further samples of urine after the applicant has abstained from any excess of liquid for several hours.

In this group the risks were taken while the solids were low—persistently low. The number of exposures is 7,401 representing \$11,941,100 of insurance. The probable claims calculated on the American Experience Table is 68+ in number and \$114,973 in amount and on the Compound Progressive Table 43.7+ in number and \$75,522 in amount. The actual claims were 34 in number and \$68,500 in amount, giving us 50% by number and 60% by amount on the American, and 78% by number and 91% by amount on the Compound Progressive tables.

In Table XVIII, we find that of the 34 actual claims in this group, only four reported causes of death have any direct or indirect relation to the urinary tract. There was one death from Cerebral Hemorrhage or Apoplexy, one from Organic Heart Disease, one from Cirrhosis of the Liver, and one from Nephritis or Bright's Disease.

**GROUP 5. Slightest possible trace of albumin. Low specific gravity. Relatively low urea. Excess of leucocytes and neck of bladder and urethral cells. Some squamous epithelium. Rarely a blood globule. No casts found.**

In this group we have a study of low solids accompanied by evidence of a mild disturbance in the lower part of the urinary tract. Except for the relatively low solids, the condition of the urine is very much like that in Group 2.

The usual causes of low solids have already been considered under Group 4, but here, with the presence of a small amount of albumin, the danger of a chronic interstitial nephritis is, if anything, greater than in Group 4. It, therefore, remained for us to determine by all available means that a chronic nephritis did *not* exist. The study of a number of specimens obtained under varying conditions and particularly of samples obtained after the applicant had avoided any excess of liquids for a number of hours was essential. A reliable and observing Medical Examiner will generally find out the cause of a low specific gravity especially if due to the ingestion of an excess of liquid. Of infinite help also is the absence of a history or any physical signs pointing to a serious kidney disease.

The insurance risks in this group have, therefore, been the subjects of sufficient study to satisfy us of a reasonable cause for the low solids before issuing a policy, and our experience has thus far been a favorable one. The number of exposures is 4,348, involving \$10,103,700 of insurance. The probable claims were calculated as 41.5+ in number and \$113,700 in amount on the American, and 26.7+ in number and \$77,876 in amount on the Compound Progressive tables. The actual claims were 21 in number and \$36,700 in amount, making 51% by number and 32% by amount on the American Experience, and 78% by number and 47% by amount on the Compound Progressive tables.

Of the 21 actual claims in this group we find, by referring to Table XVIII, that seven causes of death have a direct or indirect connection with the urinary tract. There were three deaths from Organic Heart Disease, one from Cirrhosis of the

Liver, one from Simple Peritonitis, one from Nephritis or Bright's Disease, and one from Diseases of Pregnancy.

**GROUP 6.** Slightest possible trace of albumin. No sugar found. High specific gravity (1030 or more). Relatively high urea (2.5% or more). Occasional blood globule, few leucocytes and cells from urethra or neck of bladder. Excess of mucin. No casts found.

This group has been introduced into our studies to learn the real significance of a concentrated urine, whether temporary or permanent, as an element in longevity. This class of cases is in many respects like those of Group 2 except that the urine is highly concentrated. The specific gravity is 1030 or more and the percentage of urea 2.5 or higher. The morphological elements in the sediment are about the same as in Group 2.

In this group we find more particularly the disturbing or irritating action of a concentrated urine on the mucous membrane of the lower part of the urinary tract, as indicated by the elements in the sediment. While this condition is not uncommon in the male, it is very often seen in the female, the probable explanation being that women take less liquid than men.

We also find in this class of cases the lasting effects of an old gonorrhœa, without urethral stricture. We all know how commonly this condition exists, but without any effect on the length of life. We have, therefore, looked upon this group as relatively unimportant.

The number of exposures in this group is 10,870 representing \$27,765,900 of insurance. The probable claims are 100+ in number and \$268,741 in amount on the American, and 62.5+ in number and \$169,981 in amount on the Compound Progressive tables. The actual number of claims is 42 in number and \$120,700 in amount, giving us 42% by number and 45% by amount on the American Experience table, and 67% by number and 71% by amount on the Compound Progressive table.

In this group there were 42 actual claims and of these only

six causes of death appear to be in any way connected with the urinary system (see Table XVIII). There was one death from Chronic Lead Poisoning, one from Cerebral Hemorrhage or Apoplexy, one from Embolism or Thrombosis, one from Simple Peritonitis, one from Nephritis or Bright's Disease, and one from other Diseases of the Kidneys and Annexa.

**GROUP 7.** *First Examination:* Slightest possible trace of albumin. Relatively normal solids. Rare or occasional hyaline and granular casts. Occasionally or rarely a blood globule. *Subsequent Examinations:* Slightest possible trace, or no albumin. Relatively normal solids. Rarely a blood globule, excess of leucocytes, and neck of bladder or urethral cells, or sediment negative.

In this group of cases we found at our first examination in the Home Office Laboratory evidence of a slight renal disturbance similar to what we found in Group 1. These cases were not considered insurable at that time. One or more samples of urine were requested after two, three, or four weeks, and our further study satisfied us that the condition originally found had disappeared and then policies were issued on the regular plans. The greater number of cases in this group were between the ages of 13 and 57 as will be seen by referring to tables XIII, XIV, and XV, but in reality the majority were between the ages of 25 and 45 and very few, indeed, were accepted after the age of 50.

These cases were not considered eligible for Group 1 for a variety of reasons, but principally because of either the age, the occupation, or the history of albuminuria, kidney disturbance or disease at some earlier date. In studying the applications and all of the facts presented, the Medical Director had a desire to know more about the urine before making a decision, and in every instance the further study of the urine demonstrated pretty clearly that the urinary findings at the original examination represented only a temporary renal disturbance of the nature of a mild irritation or congestion of the kidneys and of no serious importance.

The number of exposures in this group is 4,152, representing \$11,798,500 of insurance. The probable claims are 42.8+ in number and \$131,797 in amount on the American Table, and 28.7+ in number and \$89,643 in amount on the Compound Progressive Table. The actual claims were 20 in number and \$41,500 in amount, making 47% by number and 31% by amount on the American, and 70% by number and 46% by amount on the Compound Progressive tables.

By referring again to Table XVIII we find that of the 20 actual claims, only a comparatively few deaths have any direct or remote connection with the urinary tract. There was one death from Diabetes, one from Pericarditis or Acute Endocarditis, two from Organic Heart Disease, and one from Nephritis or Bright's Disease.

**GROUP 8. First Examination:** Very slight trace of albumin. Relatively normal or high solids. Few hyaline and granular casts, with renal cells and blood adherent. *Subsequent Examinations:* (After three months). Slightest possible trace or absent albumin, relatively normal solids. No casts found. Rarely or absent blood globules and leucocytes.

Here we have a marked renal disturbance as is shown by the decided trace of albumin and a good number of casts, some of which have blood and renal cells adherent. This condition of the kidneys might well be a rather severe irritation, or, perhaps, a chronic disease of the kidneys with a mild active or acute condition superimposed. With the solids of the urine relatively normal and a negative clinical history in a person under 40 years of age, it is fairly safe to decide that the kidney condition probably belongs to the class of renal congestion or irritation secondary to some disturbance outside the urinary tract. It has been our custom to treat these cases as probably temporary derangements of the kidneys and postpone action for a number of months and then reconsider them. If, after the lapse of two or three months, examinations of a number of specimens of urine showed an absence of casts and either a perfectly normal urine, or only a slight local disturbance below

the kidneys, the risks were accepted. In other words, the marked disturbance of the kidneys had to the best of our knowledge been only temporary and had entirely cleared up at the time the risks were assumed.

The number of exposures in this impairment is 818 with \$1,160,900 of insurance involved. The probable claims were calculated to be 7.1+ in number and \$11,820 in amount on the American table, and 4.4+ in number and \$7,694 in amount on the Compound Progressive table. The actual number amounted to one \$1000 claim, giving 14% by number and 8% by amount on the American Experience table, and 23% by number and 13% by amount on the Compound Progressive table.

Notwithstanding this favorable showing in a ten-year period, I must confess a feeling of some anxiety as to the results we shall obtain in from 15 to 20 years for the reason that, in this particular group of cases, the character of the urine varies greatly from week to week. There is, therefore, a likelihood of accepting risks who have an important kidney disease. This danger is increased because of our limited means of getting at the true condition through the urine or by physical examination.

After a long study of the cases such as we encounter in this group, I am unable to satisfactorily explain why the urine to-day will show a decidedly unfavorable appearance and a week or so later will be practically normal, but still another week later will be as unfavorable as the original specimen of urine. But such is the fact, and it is needless for me to say that where the improved condition of the urine was not found constant, the cases were not accepted for insurance. Although our figures for this impairment are comparatively small, yet they are satisfactory for about ten years, but it is at the same time clear that these risks must be selected with great care.

The reported cause of death in the single claim in this group was Disease of the Intestines.

**GROUP 9. *First Examination: No albumin. Relatively***



low solids. No casts or blood or other morphological elements. *Subsequent Examinations:* No albumin. Relatively normal solids. No casts or blood or other morphological elements found.

We have here a group of insurance risks in which the urine, at the first examination, showed nothing of importance except relatively low solids—a specific gravity below 1012, and less than 1.5% of urea. At subsequent examinations of the urine after one, two, or even four weeks, the solids were found to return to the normal and the urine was in other respects found to be perfectly normal. Most of these cases were less than 45 years of age at the time they applied for insurance, and the greater number of them were between the ages of 25 and 40 years.

These risks were not considered eligible for Group 4, at the first examination, and subsequent analyses of the urine were deemed advisable to ascertain whether the solids were persistently or only temporarily low. Usually we were able to learn through the Medical Examiner in the field the most probable cause of the low specific gravity of the first specimen of urine, and the policy was then issued.

The number of exposures in this group is not very large, there being only 1,177, involving \$3,813,400 of insurance. The probable claims were calculated to be 12.4+ in number and \$38,200 in amount on the American Experience, and 8.7+ in number and \$26,214 in amount on the Compound Progressive tables. The actual claims amounted to 9 in number and \$13,000 in amount, giving us 72% of the expected by number and 34% by amount on the American, and 103% by number and 50% by amount on the Compound Progressive tables.

The percentages in this group are exceptionally high and probably due to the comparatively small number at risk. We should expect a low percentage in this group because of the fact that the urine was perfectly normal at the time the risks were taken, and I believe that as the number of cases at risk increases we shall see a substantial drop in these figures.

In this group there were nine actual claims and of these only



three deaths appear to be in any way connected with the urinary tract, *i. e.*, three deaths from Organic Heart Disease. (Table XVIII.)

**GROUP II.** *First Examination:* Slightest possible trace or absent albumin. Relatively normal solids. Sugar present varying from very slight trace to a large trace. Occasionally or rarely a blood globule and excess of leucocytes, and neck of bladder or urethral cells. Rarely a hyaline and granular cast, or no casts found. *Subsequent Examinations:* Slightest possible trace, or absent albumin. Relatively normal solids. No sugar found by copper or phenylhydrazine tests. Occasional or rare blood globule. Excess of leucocytes and neck of bladder and urethral cells. No casts found.

This is a study of glycosurias where the amount of sugar in the urine at the time of the original examination varied from a very slight trace to a large trace. At this first urinary examination there may have been also evidence of renal disturbance as shown by the presence of renal casts and renal cells, or there may have been evidence of a disturbance in the lower part of the urinary tract; in other words, there was usually some indication of a disturbance of some part of the urinary tract due to the irritating action of the sugar. Such cases were never granted insurance while the urine showed the presence of sugar, but they were postponed for a number of weeks or months with the belief that we were dealing with a temporary glycosuria. When, after a number of analyses of the urine obtained under varying conditions and at different times of day, the sugar was found to have disappeared and during the period of observation had not reappeared, policies of insurance were given on the regular plans. Very few, if any, of these cases were given insurance if they were heavy weights or if they were in any other way impaired, and particular attention was given to the age, very few being accepted below the age of 25.

As a class these cases have shown an unusually high mortality up to the eighth or ninth year of exposure, and just why

this should be so I am unable to explain. As will be seen by Table XVIII very few have died of Diabetes Mellitus, but a possible explanation is that there was a lowered resistance to the action of acute diseases caused by the failure to convert sugars and starches into glycogen.

This number of exposures is not large, there being 1,394, involving \$3,364,100 of insurance. The probable claims were figured to be 13.5+ in number and \$34,866 in amount on the American Experience Table, and 8.79+ in number and \$22,923 in amount on the Compound Progressive Table. The actual claims were 8 in number and \$94,000 in amount, making 59% of the expected by number and 270% by amount on the American, and 91% by number and 410% by amount on the Compound Progressive tables.

Our figures by amount are very high, but by referring to Tables III and V it will be seen that we had one \$25,000 claim in the first year of exposure and one \$50,000 claim in the third year of exposure. These account for a large part of the \$94,000 of claims and for our high percentages by amount on both the American and the Compound tables.

Of the eight actual claims in this group there were only two causes of death which appeared to be in any way connected with the urinary system (see Table XVIII). There was one death from Paralysis, and one from Organic Heart Disease. There were no deaths reported as the result of Diabetes.

To summarize our figures in these eleven groups, excepting Group 10 (see Table I), we have a total of 59,270 exposures, representing \$155,695,300 of insurance. The probable claims in all groups were calculated as 576+ in number and \$1,637,298 in amount on the American Experience table, and 374+ in number and \$1,082,871 in amount on the Compound Progressive table. The actual claims were 261 in number and \$718,500 in amount, giving us 45% of the expected by number and 44% by amount on the American table, and 70% by number and 66% by amount on the Compound Progressive table.

For a better understanding of the figures which have been presented, you are referred to Table III. Here we find a

total of 19,564 cases at risk involving \$57,563,800 of insurance. By adding these figures to the risks of the second year, the third year, the fourth year, etc., we have the total figures given in Table I. For example: A policy for \$1000 issued at age 30, if it remains in force three years, gives one year of experience during the first year at age 30, one year during the second year at age 31, and one year during the third year at age 32. We, therefore, have a total exposure of three years and \$3000.

In making up the probable claims our Actuary has used the same method of calculation as was employed in the Medico-Actuarial Investigation, the results of which have recently been published.

TABLE I.  
GRAND TOTAL IN ALL GROUPS.

GROUP	EXPOSURES			PROBABLE CLAIMS				ACTUAL CLAIMS		PERCENT. OF PROBABLE			
			COMPOUND PRO.	AMERICAN EXP.		COMPOUND PRO.	AMERICAN EXP.		COMPOUND PRO.				
	Number	Amount		Number	Amount		Number	Amount	Number	Amount			
1	5,546	8,154,400	58,007	87,645	40,746	62,135	31	41,200	53	47	76	66	
2	23,061	76,567,900	227,577	823,210	146,220	541,728	94	300,900	41	37	64	56	
3	503	1,025,400	5,302	12,346	3,740	9,155	1	1,000	19	8	27	11	
4	7,401	11,941,100	68,198	114,973	43,768	75,522	34	68,500	50	60	78	91	
5	4,348	10,103,700	41,543	113,700	26,577	77,376	21	36,700	51	32	78	47	
6	10,870	27,765,900	100,188	268,741	62,545	169,081	42	120,700	42	45	67	71	
7	4,152	11,798,500	42,819	131,797	28,728	89,643	20	41,500	47	31	70	46	
8	818	1,160,900	7,136	11,820	4,417	7,694	1	1,000	14	8	23	13	
9	1,177	3,813,400	12,442	38,200	8,706	26,214	9	13,000	72	34	103	50	
10													
11	1,394	3,364,100	13,537	34,866	8,795	22,923	8	94,000	59	270	91	410	
Total	59,270	\$155,695,300	576,749	\$1,637,298	374,422	\$1,082,871	261	\$718,500	45	44	70	66	

For comparison we have the figures in all of the Ordinary business, irrespective of whether analyses of urine were made or not made, for the years of 1905 to 1913 inclusive. The probable claims were calculated as 17,165 and the actual claims amounted to 8,627, giving 50.26% of the expected on the American table.

TABLE II.

## TOTAL ORDINARY BUSINESS.

Issues of 1905-1913.

Experience of 1905 to 1914.

## PROBABLE CLAIMS

17,165

## ACTUAL CLAIMS

8,627

Percentage of probable = 50.26%

It will be seen, therefore, that the figures for the risks having urinary impairments (Table I) are more than 5% under the average for all Ordinary risks for the corresponding period of time. These figures are rather astounding. Just why they are more than 5% under the average, I do not know. These cases were not treated in our Home Office any differently from those which showed no urinary impairments. We should expect a percentage a trifle above the average, and it is probable that, in 15 or 20 years of experience, a percentage somewhat above the average will obtain.

We have also given for your consideration an analysis of the issues of 1904 to 1913 inclusive in their different years of exposure.

TABLE III.  
FIRST YEAR.

GROUP	EXPOSURES		PROBABLE CLAIMS				ACTUAL CLAIMS		PERCENT. OF PROBABLE			
			AMERICAN EXP.		COMPOUND PRO.				AMERICAN EXP.		COMPOUND PRO.	
	Number	Amount	Number	Amount	Number	Amount	Number	Amount	Number	Amount	Number	Amount
1	1,018	1,550,600	9,719	15,266	5,746	9,157	3	3,000	31	20	52	33
2	8,590	30,861,900	82,009	317,825	48,576	194,321	23	104,200	28	33	47	54
3	89	174,000	870	1,862	519	1,159						
4	2,087	3,327,800	18,218	30,250	10,334	17,531	8	19,200	44	63	77	110
5	1,457	3,576,500	13,265	36,547	7,697	22,404	6	10,000	45	27	78	45
6	4,155	11,692,300	37,457	110,890	21,622	65,624	11	55,200	29	50	51	84
7	1,229	4,115,800	12,085	43,761	7,251	27,144	2	16,000	17	37	28	59
8	235	339,200	2,029	3,440	1,143	2,059						
9	247	768,300	2,389	7,343	1,423	4,361	1	1,000	42	14	70	23
10												
11	457	1,217,400	4,307	12,318	2,540	7,480	1	25,000	23	203	39	334
Total	19,564	\$57,563,800	182,348	\$579,502	106,851	\$351,240	55	\$233,600	30	40	51	67

TABLE IV.  
SECOND YEAR.

GROUP	EXPOSURES		PROBABLE CLAIMS				ACTUAL CLAIMS		PERCENT. OF PROBABLE			
			AMERICAN EXP.		COMPOUND PRO.				AMERICAN EXP.		COMPOUND PRO.	
	Number	Amount	Number	Amount	Number	Amount	Number	Amount	Number	Amount	Number	Amount
1	900	1,370,900	8,857	13,930	5,594	8,924	9	9,000	102	65	161	101
2	6,566	23,135,200	64,498	248,281	40,866	162,556	35	87,200	54	35	86	54
3	82	165,000	.828	1,845	.530	1,229						
4	1,672	2,670,100	14,872	24,768	8,986	15,291	9	10,500	61	42	100	69
5	1,080	2,651,400	10,055	28,549	6,223	18,843	5	15,000	50	53	80	80
6	2,867	7,872,600	26,361	76,626	16,205	48,390	9	16,000	34	21	56	33
7	1,001	3,330,700	10,134	37,060	6,492	24,624	4	4,000	39	11	62	16
8	206	293,500	1,862	3,134	1,077	2,011	1	1,000	55	32	93	50
9			2,192	7,221	1,398	4,577	2	2,000	91	28	143	44
10												
11	360	948,200	3,483	9,912	2,191	6,425	4	17,000	115	172	183	265
Total	14,953	\$43,173,500	143,082	\$451,326	89,502	\$292,870	78	\$161,700	55	36	87	55

TABLE V.

THIRD YEAR.

GROUP	EXPOSURES		PROBABLE CLAIMS				ACTUAL CLAIMS		PERCENT. OF PROBABLE			
			AMERICAN EXP.		COMPOUND PRO.				AMERICAN EXP.		COMPOUND PRO.	
			Number	Amount	Number	Amount			Number	Amount	Number	Amount
1	818	1,217,000	8.275	12,484	5.565	8,451	4	6,000	48	48	72	71
2	4,133	13,805,800	41.711	156,478	28.086	109,718	18	82,500	43	53	64	75
3	76	150,500	.780	1,717	.531	1,211	1	1,000	128	58	188	83
4	1,349	2,206,600	12.290	21,098	7.917	13,921	1	2,000	08	09	13	14
5	753	1,710,900	7.152	19,837	4.707	14,116	3	3,700	42	19	64	26
6	1,881	4,774,400	17.534	46,986	11.422	31,423	6	14,000	34	30	53	45
7	671	1,846,800	7.004	21,446	4.774	15,203	2	2,000	29	09	42	13
8	139	208,500	1.211	2,373	.764	1,636						
9	175	591,600	1.814	5,886	1.233	3,956						
10												
11	238	604,200	2.341	6,587	1.564	4,560	2	51,000	85	774	128	1118
Total	10,233	\$27,116,300	100.112	\$294,892	66.563	\$204,195	37	\$162,200	37	55	56	79



TABLE VI.

FOURTH YEAR.

GROUP	EXPOSURES		PROBABLE CLAIMS						ACTUAL CLAIMS		PERCENT. OF PROBABLE			
			AMERICAN EXP.			COMPOUND PRO.					AMERICAN EXP.		COMPOUND PRO.	
			Number	Amount	Number	Amount	Number	Amount			Number	Amount	Number	Amount
1	753	1,085,700	7,893	11,587	5,558	8,218	4	10,000	51	86	72	122		
2	2,003	5,694,600	20,677	65,580	14,600	48,134	9	16,000	44	24	62	33		
3	72	144,500	764	1,722	546	1,280								
4	947	1,517,100	8,945	15,087	6,095	10,537	3	4,000	34	27	49	38		
5	491	1,091,400	4,857	14,404	3,365	10,996	1	1,000	21	07	30	09		
6	988	1,954,700	9,343	19,361	6,364	13,484	7	12,000	75	62	110	89		
7	455	1,088,600	4,835	13,057	3,443	9,710	6	12,000	124	92	174	124		
8	104	142,500	897	1,251	584	819								
9	141	447,900	1,522	4,422	1,088	3,078								
10														
11	134	267,300	1,308	2,654	909	1,861								
Total	6,088	\$13,434,300	61,041	\$149,125	42,552	\$108,117	30	\$55,000	49	37	71	51		

TABLE VII.  
FIFTH YEAR.

GROUP	EXPOSURES		PROBABLE CLAIMS				ACTUAL CLAIMS		PERCENT. OF PROBABLE			
			AMERICAN EXP.		COMPOUND PRO.				AMERICAN EXP.		COMPOUND PRO.	
	Number	Amount	Number	Amount	Number	Amount	Number	Amount	Number	Amount	Number	Amount
1	693	986,900	7.526	10,891	5.602	8,163	3	4,000	40	37	54	49
2	1,004	1,985,400	10.395	22,571	7.621	17,133	4	5,000	38	22	52	29
3	69	139,400	.759	1,743	.570	1,360						
4	645	1,047,200	6.370	10,977	4.563	8,068	6	6,900	94	63	131	86
5	309	743,500	3.167	10,551	2.316	8,464	5	5,000	158	47	216	59
6	598	975,600	5.701	9,752	4.047	7,079	6	20,500	105	210	148	290
7	342	638,400	3.659	7,157	2.710	5,410	4	4,000	109	56	148	74
8	68	87,800	.597	781	.409	538						
9	129	417,600	1.427	4,190	1.066	3,042	2	2,000	140	48	188	66
10												
11	93	141,800	.925	1,416	.667	1,029	1	1,000	108	71	150	97
Total	3,950	\$7,163,600	40.526	\$80,029	29.571	\$60,286	31	\$48,400	76	60	105	80

TABLE VIII.  
SIXTH YEAR.

GROUP	EXPOSURES		PROBABLE CLAIMS				ACTUAL CLAIMS		PERCENT. OF PROBABLE			
			AMERICAN EXP.		COMPOUND PRO.				AMERICAN EXP.		COMPOUND PRO.	
	Number	Amount	Number	Amount	Number	Amount	Number	Amount	Number	Amount	Number	Amount
1	619	842,300	6,061	9,710	5,442	7,654	1	1,000	14	10	18	13
2	467	695,600	4,889	7,425	3,747	5,757	5	6,000	102	81	133	105
3	57	114,500	647	1,486	511	1,213						
4	403	651,100	4,130	6,820	3,135	5,253	5	22,900	121	336	159	436
5	167	224,200	1,823	2,421	1,414	1,879			55	83	71	106
6	257	322,600	2,514	3,205	1,875	2,412	3	3,000	119	94	160	124
7	251	415,700	2,752	4,805	2,135	3,792	1	2,500	36	52	47	66
8	36	47,400	324	435	232	315						
9	118	397,600	1,351	4,103	1,061	3,126	2	6,000	148	146	189	192
10												
11	64	112,700	649	1,155	495	883						
Total	2,439	\$3,823,700	26,040	\$41,565	20,047	\$32,268	18	\$43,400	69	104	90	134

TABLE IX.

SEVENTH YEAR.

GROUP	EXPOSURES		PROBABLE CLAIMS				ACTUAL CLAIMS		PERCENT. OF PROBABLE			
			AMERICAN EXP.		COMPOUND PRO.				AMERICAN EXP.		COMPOUND PRO.	
	Number	Amount	Number	Amount	Number	Amount	Number	Amount	Number	Amount	Number	Amount
1	459	644,800	5,355	7,689	4,342	6,282	4	4,200	75	55	92	67
2	183	261,500	2,030	2,870	1,624	2,292						
3	37	82,000	.429	1,142	.348	970						
4	230	403,300	2,493	4,468	1,982	3,615	2	3,000	80	67	101	83
5	73	82,800	.895	1,006	.735	826						
6	81	101,200	.818	1,059	.632	834						
7	151	274,500	1,670	3,284	1,334	2,689						
8	21	28,000	.191	265	.141	201						
9	87	335,600	1,057	3,532	.863	2,780	2	2,000	189	57	232	72
10												
11	31	44,000	.335	496	.268	404						
Total	1,353	\$2,257,700	15,273	\$25,811	12,269	\$20,893	8	\$9,200	52	36	65	44

TABLE X.  
EIGHTH YEAR.

GROUP	EXPOSURES	PROBABLE CLAIMS	ACTUAL CLAIMS	PERCENT. OF PROBABLE			
	Number	Amount	AMERICAN EXP.		COMPOUND PRO.		
			Number	Amount	Number	Amount	
1	229	366,700	2,702	4,650	2,268	3,974	75
2	78	119,100	.910	1,365	.760	1,133	
3	18	52,500	.192	796	.157	705	88
4	53	85,900	.672	1,095	.571	941	
5	14	19,000	.252	308	.229	277	74
6	32	49,500	.336	563	.273	471	
7	42	74,500	.529	1,000	.452	863	65
8	9	14,000	.085	141	.067	115	
9	47	95,700	.521	1,190	.429	1,019	32
10							
11	11	21,500	.122	248	.103	212	26
Total	533	\$898,400	6,321	\$11,356	5,309	\$9,710	
							38
							31

TABLE XI.  
NINTH YEAR.

GROUP	EXPOSURES	PROBABLE CLAIMS	ACTUAL CLAIMS	PERCENT. OF PROBABLE			
	Number	Amount	AMERICAN EXP.	COMPOUND PRO.	Number	Amount	COMPOUND PRO.
1	53	85,500	.676	1,395	.592	1,275	
2	33	62,800	.417	752	.365	646	
3	3	3,000	.033	33	.028	28	
4	14	31,000	.199	401	.178	358	
5	4	4,000	.077	77	.071	71	
6	11	23,000	.124	299	.105	264	
7	9	12,500	.142	218	.130	201	
8							
9	14	23,200	.169	313	.145	275	
10							
11	6	7,000	.067	80	.058	69	
Total	147	\$252,000	1.904	\$3,568	1.672	\$3,187	
					2	\$2,000	
					105	56	
					120	63	

TABLE XII.  
TENTH YEAR.

GROUP	EXPOSURES		PROBABLE CLAIMS						ACTUAL CLAIMS		PERCENT. OF PROBABLE			
			AMERICAN EXP.		COMPOUND PRO.		AMERICAN EXP.				COMPOUND PRO.			
	Number	Amount	Number	Amount	Number	Amount	Number	Amount	Number	Amount	Number	Amount		
1	4	4,000	.043	43	.037	37								
2	4	6,000	.041	63	.035	54								
3														
4	1	1,000	.009	9	.007	7								
5														
6														
7	1	1,000	.009	9	.007	7								
8														
9														
10														
11														
Total	10	\$12,000	.102	\$124	.086	\$105								

Certain groups make an unfavorable showing when considered by years of exposure. For example, Group II (glycosurias) shows the effect of unusually large claims *by amount*. In the first year there was one claim of \$25,000, in the second year four claims amounting to \$17,000, and in the third year two claims amounting to \$51,000, thus raising the average *by amount* of insurance for the ten years to 270%, but calculated *by the number* of claims the percentage was 59 on the American table. Some of the other groups were unfortunate in having exceptionally large claims *by amount* in some one or more years of exposure, and yet our averages for the ten years are very gratifying, as will be seen by referring to Table I.

Let us now consider the exposures by ages at entry. The Actuary has given us four classes, 13-27, 28-42, 43-57, and 58-72.



TABLE XIII.

AGES AT ENTRY 13-27.

GROUP	EXPOSURES		PROBABLE CLAIMS				ACTUAL CLAIMS		PERCENT. OF PROBABLE			
			AMERICAN EXP.		COMPOUND PRO.				AMERICAN EXP.		COMPOUND PRO.	
	Number	Amount	Number	Amount	Number	Amount	Number	Amount	Number	Amount	Number	Amount
1	1,685	2,086,200	13,719	17,011	8,496	10,552	8	8,200	58	48	94	78
2	6,777	11,084,400	54,598	89,414	31,758	51,686	21	53,500	38	60	66	104
3	110	204,500	.899	1,681	.562	1,060						
4	2,833	3,312,200	22,893	26,763	13,552	15,837	9	8,900	39	33	66	56
5	1,444	1,995,100	11,620	16,041	6,796	9,328	6	8,000	52	50	88	86
6	4,303	6,708,800	34,575	54,014	20,119	31,244	18	18,700	52	35	89	60
7	1,110	1,524,200	8,974	12,329	5,386	7,338	1	1,000	11	8	19	14
8	512	606,900	4,121	4,887	2,448	2,904	1	1,000	24	20	41	34
9	338	1,156,500	2,768	9,345	1,730	5,820	2	2,000	72	21	116	34
10												
11	367	441,200	2,963	3,563	1,749	2,090	1	10,000	34	281	57	478
Total	19,479	\$29,120,000	157,130	\$235,048	92,596	\$137,859	67	\$111,300	43	47	72	81

TABLE XIV.  
AGES AT ENTRY 28-42.

GROUP	EXPOSURES		PROBABLE CLAIMS				ACTUAL CLAIMS		PERCENT. OF PROBABLE			
			AMERICAN EXP.		COMPOUND PRO.				AMERICAN EXP.		COMPOUND PRO.	
			Number	Amount	Number	Amount			Number	Amount	Number	Amount
I	2,833	4,344,200	26,668	41,211	18,062	27,965	13	17,000	49	41	72	61
2	12,123	44,011,200	111,443	408,583	69,312	253,295	44	136,900	39	34	63	54
3	298	428,400	2,848	4,103	1,940	2,786	1	1,000	35	24	32	36
4	3,975	7,114,100	36,429	66,413	23,346	43,181	20	42,600	55	64	86	99
5	2,383	4,773,700	21,907	44,142	13,840	27,662	11	22,700	50	51	79	82
6	5,327	15,905,700	48,368	145,503	29,885	89,264	15	68,000	31	47	50	76
7	2,155	6,126,900	19,998	57,144	12,857	36,170	11	26,500	55	46	86	73
8	276	428,000	2,509	3,933	1,594	2,515						
9	587	1,955,900	5,488	18,458	3,640	12,263	3	3,000	55	16	82	24
10												
11	813	2,171,100	7,566	20,293	4,843	12,892	2	51,000	26	251	41	395
Total	30,770	\$87,259,200	283,224	\$809,783	179,319	\$507,993	120	\$368,700	42	46	67	73

TABLE XV.

AGES AT ENTRY 43-57.

GROUP	EXPOSURES		PROBABLE CLAIMS						ACTUAL CLAIMS				PERCENT. OF PROBABLE	
			AMERICAN EXP.		COMPOUND PRO.		AMERICAN EXP.		COMPOUND PRO.					
	Number	Amount	Number	Amount	Number	Amount	Number	Amount	Number	Amount	Number	Amount		
I	943	1,625,800	14,377	25,779	11,408	20,513	7	13,000	49	50	61	63		
2	3,958	20,031,400	54,761	277,332	39,773	199,406	26	106,500	47	38	65	53		
3	88	378,500	1,313	6,079	1,031	4,895								
4	565	1,478,800	7,891	20,523	6,019	15,397	5	17,000	63	83	83	110		
5	503	3,262,900	7,122	49,571	5,322	37,205	4	6,000	56	12	75	16		
6	1,210	5,080,400	16,266	67,052	11,778	47,813	9	34,000	55	51	76	71		
7	825	4,020,800	11,656	58,041	8,660	42,611	7	13,000	60	22	81	31		
8	23	39,000	308	496	226	359								
9	238	687,000	3,703	9,914	2,922	7,717	4	8,000	108	81	137	104		
10														
11	209	704,800	2,866	9,652	2,095	6,899	5	33,000	174	342	239	478		
Total	8,562	\$37,309,400	120,263	\$524,439	89,234	\$382,815	67	\$230,500	56	44	75	60		

TABLE XVI.  
AGES AT ENTRY 58-72.

GROUP	EXPOSURES		PROBABLE CLAIMS						ACTUAL CLAIMS		PERCENT. OF PROBABLE			
			AMERICAN EXP.		COMPOUND PRO.		AMERICAN EXP.				COMPOUND PRO.			
	Number	Amount	Number	Amount	Number	Amount	Number	Amount	Number	Amount	Number	Amount	Number	Amount
1	85	98,200	3.243	3,644	2.780	3,105	3	3,000	93	82	108	97		
2	203	1,440,900	6.775	47,881	5.377	37,341	3	4,000	44	08	56	11		
3	7	14,000	.242	483	.207	414								
4	28	36,000	.985	1,274	.851	1,107								
5	18	72,000	.894	3,946	.799	3,681								
6	30	71,000	.979	2,172	.763	1,660								
7	62	126,600	2.191	4,283	1.825	3,524	1	1,000	46	23	55	28		
8	7	87,000	.198	2,504	.149	1,916								
9	14	14,000	.483	483	.414	414								
10														
11	5	47,000	.142	1,358	.108	1,042								
Total	459	\$2,006,700	16.132	\$68,028	13.273	\$54,204	7	\$8,000	43	12	53	15		

TABLE XVII.

SUMMARY BY AGES.

AGES AT ENTRY	EXPOSURES		PROBABLE CLAIMS				ACTUAL CLAIMS		PERCENT. OF PROBABLE			
			AMERICAN EXP.		COMPOUND PRO.				AMERICAN EXP.		COMPOUND PRO.	
	Number	Amount	Number	Amount	Number	Amount	Number	Amount	Number	Amount	Number	Amount
13-27	19,479	29,120,000	157,130	235,048	92,596	137,859	67	111,300	43	47	72	81
28-42	30,770	87,259,200	283,224	809,783	179,319	507,993	120	368,700	42	46	67	73
43-57	8,562	37,309,400	120,263	524,439	89,234	382,815	67	230,500	56	44	75	60
58-72	459	2,006,700	16,132	68,028	13,273	54,204	7	8,000	43	12	53	15
Total	59,270	\$155,695,300	576,749	\$1,637,298	374,422	\$1,082,871	261	\$718,500	45	44	70	66

At the ages from 13 to 27 we find two groups rather high. No. 9 is large *by number*, 72%, but probably, due to the small number at risk. No. 11 is high *by amount* due to the few large claims. At ages from 28-42 we find group 11 still high *by amount* due to the two claims, one for \$50,000. At the ages from 43 to 57 we find groups 9 and 11 still high by both *number* and *amount* apparently due partly to the small number at risk and partly to rather large claims by amount, particularly in group 11. At ages from 58 to 72, the number at risk is so small as to give us very little reliable data.

In Table XVIII we have the reported causes of death together with the urinary impairments at the time the risks were accepted for insurance.

TABLE XVIII.

## DEATH CLAIMS.

Actuarial Code Number	Reported Causes of Death	GROUPS										DEATHS	
		1	2	3	4	5	6	7	8	9	11	Number	Amount
1	Typhoid Fever.....	1	2				5				1	9	\$ 32,200
12	Erysipelas.....		1									1	3,000
14	Purulent Infection and Septicæmia.....	1	1					1				3	4,000
16	Pellagra.....				1							1	1,200
17	Tuberculosis of the lungs..	8	13		9	4	7	3		3	2	49	71,600
18	Other Varieties of Tubercu- losis.....						1					2	2,000
21	Cancer and other Malignant Tumors.....	1	9		3	1		1				15	81,000
22	Acute Articular Rheumatism.....						1					1	5,000
23	Chronic Rheumatism and Gout.....						1					1	2,000
24	Diabetes.....							1				1	1,000
25	Anæmia and Chlorosis....							1		1		2	3,500
26	Other general diseases....		1				1	1				2	6,000
27	Alcoholism — Acute or Chronic.....		1									1	1,500
28	Chronic Lead Poisoning...		1				1					2	2,000
29	Other chronic Poisoning...		1									1	1,000
30	Inflammation of Brain and its Membranes.....	1	2		1	2	2					8	21,700
33	Cerebral Hemorrhage and Apoplexy.....			3	1		1					5	10,000
34	Softening of the Brain....						1					1	2,000
35	Paralysis without speci- fied cause.....	2	1								1	4	30,000
36	General Paralysis of the Insane.....		1									1	1,000
		14	38		15	7	21	7		4	4	110	\$281,700

TABLE XVIII—Continued

## DEATH CLAIMS

Actuarial Code Number	Reported Causes of Death	GROUPS										DEATHS	
		1	2	3	4	5	6	7	8	9	11	Number	Amount
	<i>Brought forward</i> .....	14	38		15	7	21	7		4	4	110	\$281,700
37	Other forms of Mental Ali- enation.....		2					1				3	5,000
39	Other diseases of the Ner- vous System.....				1							1	1,000
42	Pericarditis and Acute Endocarditis.....		1					1				2	2,000
43	Organic Diseases of the Heart.....	5	4		1	3		2		3	1	19	35,400
44	Angina Pectoris.....	1	1					1				1	1,000
46	Embolism and Thrombosis Bronchopneumonia.....	1	1									3	3,000
50	Pneumonia.....	2	8	1	4	4	1				1	1	1,000
51	Other diseases of the Re- spiratory System.....	1						1				2	2,000
56	Other Diseases of the Stomach and Mouth...					1	1	1				3	4,000
60	Appendicitis and Typh- litis.....		4			1	2					7	26,000
61	Hernias Intestinal Ob- struction.....				1		1					2	2,000
62	Other diseases of the In- testines.....	1			2	1			1			5	8,000
63	Cirrhosis of the Liver....				1	1		1				2	2,500
64	Biliary Calculi.....							1				1	1,000
66	Simple Peritonitis, non- puerperal.....		1			1	1					3	3,000
68	Nephritis and Bright's Dis- ease.....	3	4		1	1	1	1				11	16,000
69	Other Diseases of Kidneys and Annexa.....						1					1	1,000
76	Diseases of Pregnancy and the Puerperal State.....				1	1						2	2,000
77	Gangrene.....				1							1	1,500
81	Suicide.....	2	6		2		4	1		1	1	17	88,500
82	Burns and Conflagrations.	1					2					3	4,000
83	Accidental Drowning.....	4			1		1	1			1	8	76,000
86	Other varieties of Trauma- tism.....		5		1			1				7	11,500
87	Effects of cold, heat, light- ning.....		1									1	17,700
90	Fractures, cause not speci- fied.....	2	2		1			1				6	7,000
91	Other external violence...		3		1			1		1		6	15,700
92	Ill-defined organic diseases							1				1	1,000
93	Sudden death.....		4				2	1				7	34,000
94	Cause of death not speci- fied or ill-defined.....		3				1					4	4,000
		31	94	1	34	21	42	20	1	9	8	261	\$718,500

In Table XIX we have a condensed classification of the causes of death. There are 13 general classes and in column 1 are the claims showing urinary impairments; in column 2, the claims of 1912 on the issues of 1905 to 1912; in column 3, the claims of 1914 on the issues of 1892 to 1914; and in columns 4, 5, and 6 we have the percentages. Of the 261 claims we have 91 or 34.87% from General Diseases; 23 or 8.81% from Diseases of the Nervous System; 25 or 9.58% from Diseases of the Circulatory System; 24 or 9.2% from Diseases of the Respiratory System; 23 or 8.81% from Diseases of the Digestive System; 12 or 4.6% from Diseases (non-venereal) of the Genito-urinary System and Annexa; 48 or 18.38% from External causes; and 12 or 4.6% from Ill-defined Diseases.

It will be seen that our highest mortality was from General Diseases and External causes, but that the percentages of claims with urinary impairments are very close to the percentages of claims of 1912, in the total issues of 1905 to 1912. It is interesting to note that in Diseases of the Urinary System and Annexa, we have 4.6% with urinary impairments while there was 7.37% in the total business issued during practically the same period. In Diseases of the Circulatory System there was 9.58% with urinary impairments as against 8.96% of the claims of 1912. The percentage with urinary impairments is here relatively high, and probably partly because of the paucity of data, and partly to the fact that disturbances of the urinary system are very common in Diseases of the Circulatory System.

For the purpose of comparison we have included the claims paid in 1914 on policies issued from 1892 to 1914. Some of these policies were in force 22 or 23 years. While the length of time influences the cause of death in these cases, it is of interest to note that about the same ratios obtain as for the shorter period. The percentage of deaths from Diseases of the Genito-urinary System and Annexa is not one-half the total percentage.



TABLE XIX.

	Claims with Urinary Impairments	Claims in 1912 on issues of 1903 to 1912	Claims in 1912 on issues of 1892 to 1914	Urinary Impairments	Ratio Issue '03-'12 in 1912	Issue '92-'14 in 1914
I General Diseases.....	91	469	1041	34.87	32.33	31.17
II Diseases of the Nervous System, etc.....	23	137	378	8.81	9.44	11.32
III Diseases of the Circula- tory System.....	25	130	378	9.58	8.96	11.32
IV Diseases of the Respira- tory System.....	24	165	318	9.20	11.37	9.52
V Diseases of the Digestive System.....	23	157	303	8.81	10.82	9.07
VI Non-venereal Diseases of the Genito-Urinary..	12	107	389	4.60	7.37	11.65
VII The Puerperal State....	2	5	8	.77	.34	.24
VIII Diseases of the Skin and of the Cellular Tissue..	1	7	19	.38	.48	.57
IX Diseases of the Bones and of the Organs of Loco- motion.....		1	12		.07	.36
X Malformations.....			4			.12
XI Old Age.....		1	5		.07	.15
XII External Causes.....	48	226	448	18.38	15.58	13.40
XIII Ill-defined Diseases.....	12	46	37	4.60	3.17	1.11
GRAND TOTAL ALL CAUSES.....	261	1451	3340	100.00	100.00	100.00

We have referred to the fact that the applicants for insurance showing the different urinary impairments, already considered, were accepted on regular plans issued by the Metropolitan. For the purpose of showing the distribution of the different kinds of policies among the 19,564 risks, you are referred to Table XX on the following page.

It will be observed that for nine years in the Life, Endowment at age 85, Endowment at age 90, and Reduced Premium Life policies, the total issue amounted to 136,831 or 22.13%. Those with Urinary Impairments amounted to 5,438 or 27.79%—just 5.66% above the average.

In the Limited Payment Life, and Optional Life and Endowment policies there was a total issue of 280,767 or 45.41%

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while those with Urinary Impairments amounted to 7,554 or 38.61%,—or 6.8% below the average.

TABLE XX.

Kind of Policy	Entire Issue	Per cent. of total	Urinary Impairments	Per cent. of total
Life	136,831	22.13	5,438	27.79
Endt. at 85				
Endt. at 90	280,767	45.41	7,554	38.61
Reduced Prem. Life				
Ltd. Pay. Life				
Op. Life & Endt. }				
Regular Endts. ....	182,250	29.48	6,003	30.68
Miscellaneous. ....	18,432	2.98	569	2.92
TOTAL	618,280	100.00	19,564	100.00

In the regular Endowment policies there was a total issue of 182,250 or 29.48%. Those with Urinary Impairments amounted to 6,003 or 30.68%—just 1.2% above the average.

This table shows very clearly that the relatively low mortality in policies with some urinary impairment is not due to a large proportion of those in the Endowment class.

We propose to continue the study of these groups of impairments and, with a larger number of cases at risk, to make smaller subdivisions, from which valuable information should be obtained.

In conclusion, I wish to thank Dr. T. H. Willard, and Dr. A. S. Knight, Medical Directors, and Mr. James D. Craig, Assistant Actuary of the Metropolitan Life Insurance Company for valuable suggestions and help in the preparation of this paper.

Dr. Porter—Gentlemen, this is certainly a most valuable contribution and one that will require a great deal of thought and study before it can be properly grasped, making it difficult

for unprepared discussion. We have with us, however, two or more members who have been in conference with Dr. Ogden, as I understand it, and are prepared to open the discussion. When they have completed their discussion, I should be very glad indeed for a general discussion of the paper so far as it is possible to have such discussion without additional study. I will ask Dr. Blakely to open the discussion.

#### DISCUSSION.

Dr. Blakely—Mr. President and Gentlemen: We are much indebted to Dr. Ogden for this paper, not only for its great value intrinsically, but also because he is the only member of the Association who has accumulated anything like such a volume of material. He is the only member who could give us this paper to-day. It is a splendid piece of work to put on record such carefully tabulated results, results which have been obtained in a series of years and by uniform methods. The period of time is long enough and the numbers large enough to make them of very real value. They will serve as a basis of comparison for later results in the Metropolitan's experience and will be referred to frequently by any company which is doing work along similar lines.

That urinalysis for life insurance companies is of great importance, no one doubts. That it is a technical task, calling for high-grade expert service, is coming to be realized more generally than formerly. I like Dr. Ogden's phrase, "The Laboratory of the Metropolitan Life Insurance Company was created in 1905." It was created to meet a very real need. It justified its establishment immediately and I am very sure that the company has never for a moment considered giving it up.

In Dr. Ogden's technique, I wish to emphasize the important place he gives to the relative proportion of urinary solids—particularly urea. So far as I know, the Metropolitan and the New England Mutual are the only two companies which pay much attention to this point.

We have a somewhat higher standard on specific gravity and urea than the Metropolitan. I shall refer to this again.

The method of obtaining a sediment for microscopic examination is a matter of great importance. Dr. Ogden has not made it quite clear whether or not negative findings are accepted in the sediment centrifuged from 15 cc. of a doubtful urine, that is, one which shows albumin or relatively low solids. He said that if a "satisfactory sediment" is not obtained, then after the sample has stood for several hours, the resulting gravity sediment is centrifuged for examination. This is the routine method followed by our New England Mutual chemists. Our bottles, used for forwarding specimens, hold four ounces, so we feel that we are getting enough sediment for a thorough test. It then becomes a question of prolonged, painstaking search. This, of course, applies only to the doubtful cases. If the first field shows casts and pus and blood, the task is simple indeed. Whether the minimum time spent on a doubtful sediment should be eight or ten or fifteen minutes must be decided by each company. Six or eight sediments per hour seems to me pretty rapid work, but I recognize that the pace in New York is faster than in Boston.

#### MORTALITIES.

Dr. Ogden seems surprised that the mortalities in his ten groups, as a whole, should be less than the general mortality in all the business of the company during the same period—45% of the American table as against 50+. "Astounding" is the word he uses. These results seem to me not surprising at all. Rather they show two things, (1) that in general the selections have been made carefully and accurately and (2) that any group of applicants accepted only after an additional and rather rigid test, will show a better mortality than the average. I believe that if one thousand or ten thousand applicants with a doubtful family history were to be accepted only after submitting urine satisfactory to Dr. Ogden, they would show a mortality lower than the average. The same would

be true if the basis of selecting the group was personal history or height or weight or even the color of the hair.

Dr. Fisher has shown that if applicants with a systolic blood pressure above 150 mm. are thrown out the mortality is better than if no attention is paid to blood pressure.

Who doubts but that we could all improve very materially our mortalities, if we had the lungs of every applicant examined by an expert in tuberculosis, or by the X-ray as suggested yesterday? Also that some who are now declined because of "pulmonary tuberculosis suspected in the past" could be taken with safety after such expert examination?

Once more, would it not be perfectly easy to improve our mortality ratios if all applicants were subjected to a Wassermann test? A few—very few—now declined because of history of chancre could, possibly, be shown to be free from syphilitic infection. And yet our policy-holders do not die of syphilis. This suggests that perhaps too much emphasis has been laid on the causes of death. It is of more or less interest to note the causes of death—particularly in the early years—but the cause of death is of far less importance than the fact that death occurs.

The essential thing in judging the acceptability or non-acceptability of risks is not to estimate what the men will die of but whether or not they have normal resistance. Are they now free from disease and are they likely to be able to resist the common infections to which we are all liable and the more severe infections to which a certain number will surely be exposed?

I am very glad the Metropolitan is accepting a certain number of risks who have had glycosuria. We shall watch their experience with the deepest interest. That some men who have had, at some time, sugar in the urine may be good average insurance risks, I suppose no one of us doubts. How to select the good from the bad is the question. After trying for several years to find a way, our mortality experience is still so discouraging that we are very sure we have not yet found the right way.

The remaining point to be discussed is, I believe, the most important of all, namely, the standard to be adopted as *safe* in these cases of urinary impairments.

How are we to rule out kidney disease in its early stages or chronic interstitial nephritis of a mild grade or circulatory disorders not yet sufficiently advanced to give typical or obvious physical signs?

Dr. Ogden spoke of the danger of "accepting risks who have an important kidney disease," a danger which "is increased because of our limited means of getting at the true condition through the urine or by physical examination."

One of the points on which the New England Mutual has differed most radically from the Metropolitan has been our insistence that, to be acceptable, a urine in any doubtful case, that is, in any case in which we have a urinalysis made by an expert chemist, the specific gravity shall be at least 1020 and the urea at least 1.7%—this is the "irreducible minimum." We also insist that such a specimen shall be free from albumin and casts.

We have found over and over again that men with kidney disease may, under favorable conditions, pass urine with a specific gravity of 1015 or 1018 or even 1020, which is free from albumin and casts but with urea low, that is, 1.5% or less or even 1.6%. When later specimens are examined, which show a specific gravity of 1020 or over and urea 1.7% or over, there is also albumin or casts or both. The same applies to men whose circulatory systems are in a doubtful condition—those who are on the ragged edge of a breakdown through high arterial tension, myocardial weakness, great nervous or mental strain, or some other cause. Were there time I could mention as illustrations a number of striking instances of this sort. They have been so numerous in our experience that we have come to regard this type of men as forming one of the most dangerous classes of risks we have to deal with.

Dr. Ogden's group 9, which shows the highest mortality of all his groups, even though they gave a "perfectly normal

urine" at the time they were accepted, may, it seems to me, include individuals belonging in this dangerous class.

In the ten years from 1905 to 1914 inclusive, we have had our chemists make examinations of the urines of 8250 applicants, involving nearly sixty-two millions of insurance. Of these we have accepted 72% by amount, and 63% by number, declining 28% by amount and 37% by number. We have divided these applicants at the end of each year (according to the reasons for sending for the urine) into three groups: first, apparently good, which includes those who were sixty years of age or over, and those who were applying for a large amount of insurance; second, those who have had, either on examination or in the past, some urinary impairment; and third, those who have been doubtful for other reasons, those for example who have had functional cardiac trouble, or heart murmur, the heavyweights, or those doubtful for any reason—in a word, we use this as an additional test to apply in many of our doubtful cases. As it happens, these three groups are almost equal—actually, 32% apparently good; 35%, doubtful urines; and 33% doubtful for other reasons. The percentage that we were able to accept with our rigid standards was—apparently good, 91% by amount, 89% by number; those with doubtful urines, 57% by amount, 53% by number; those doubtful for other reasons, 69% by amount, 67% by number. These figures have been very useful sometimes in talking with agents who insist that a chemist will find every urine doubtful. We show them we have been able to accept 91% of those who were supposed to be good; 57% of those who have had urinary impairments; and 69% of those who have had other doubtful conditions.

We have available mortality figures of just one small group, which covers a period of six years, 1903 to 1908 inclusive. There were 628 applicants who had at some time showed urinary impairments, either albumin or casts or both albumin and casts. For this six-year period the mortality was 37.8% by the American table, whereas the mortality on all of our business for the same six years was 44%. This shows a



mortality a little below the average, just as Dr. Ogden's figures show in his similar groups.

Dr. Porter—I will call upon Dr. Muhlberg to continue the discussion.

Dr. Muhlberg—Mr. President: The excellence of Dr. Ogden's paper has impelled me to put down in writing the few rather unimportant remarks which I have to make.

There are a few clinical facts that one must not neglect to keep in mind in interpreting the statistics in this splendid essay of Dr. Ogden's.

I think it is established, as strongly as any medical statement can be affirmed, that

(1) A chronic interstitial nephritis may run its entire course with only a mere trace of albumin, a few hyaline casts, and a progressive lowering of specific gravity as the sole urinary evidence of the disease. On the other hand, these same urinary findings occur frequently from trivial causes in perfectly healthy individuals with healthy kidneys.

(2) Albumin and casts in large amounts may be present for a long period of time, and even up to the death of the individual, and yet post-mortem the kidneys will be found almost normal. Albumin and casts may occur in perfectly healthy persons from such trivial causes as over-exercise to a degree that from the urinalysis alone, a diagnosis of acute Bright's disease might be made. I had occasion to examine Marathon runners in Boston after their run, and I found that their urines were loaded with albumin, blood, and casts in such quantities that if the urine had been submitted to a competent urinalysist, a diagnosis of acute Bright's disease would have been made. Then again, a large amount of albumin and casts is one of the best clinical evidences and often the only trustworthy evidence of most serious kidney involvement.

(3) No diagnosis of Bright's disease is justified from a single or even several urinalyses. A careful study with reference to the condition of the heart, arteries, metabolism, and possible sources of fecal infection or purely circulatory disturbances is necessary and this requires, as a rule, several weeks.



This being fairly well established, it devolves on the Medical Director to determine whether applicants with these impairments are insurable at all, and, if so, under what conditions. No doubt, if the insurance risk could be handled like a private patient and kept under scientific observation, the task would be simplified. But this is manifestly impossible. It is necessary, therefore, to ascertain what cases are acceptable with the limited study permitted under the circumstances.

I think Dr. Ogden has clearly demonstrated what we have all assumed to be true; namely, that where the urinary findings vary slightly from the normal, the risks are acceptable, but the point I wish to make is, that the risks are acceptable not so much because these slight variations do not at times indicate the most serious kidney involvement, but rather that they occur so often in healthy persons, that the companies can well afford to accept them as a group—on the same theory that it would be unreasonable to decline risks on account of skin warts, because occasionally, as they undoubtedly do, a certain small but definite percentage degenerate into skin cancers.

Dr. Ogden's paper points out to us how far within the limits of his studies risks are certainly acceptable. I hope some of these days that his work will be elaborated so as to give us the additional information how much further we may venture.

It would seem logical to assume that as the amounts of albumin and casts increase the risks become progressively worse until the point is reached where they would become ineligible for even substandard business. But the exact dividing line has not yet been established nor is it by any means certain that it can be established on a quantitative basis. The older members of this Society may recall a paper that Dr. W. B. Davis read before this Society at its second or third meeting, one of the earliest papers on physiological albuminuria. There was a gentleman in Cincinnati who at that time had large quantities of albumin and a few casts in his urine—I do not know how many years ago it was, twenty

or thirty perhaps; that man is still living, is to-day in good health, and has just as much albumin and casts in his urine as he had at that time.

Our rulings have been practically identical with those of the Metropolitan, if this paper may be taken as a criterion of their methods. We have very few risks on our books showing at the time of application more serious urinary impairment than those indicated in his paper, so that a study of our cases will probably only confirm Dr. Ogden's research. However, there are methods whereby we may determine the significance of larger amounts of albumin and casts. No doubt, the companies doing substandard business could contribute valuable statistics, but even the standard companies have an avenue of approach.

The company I represent is now encouraging its policy-holders to submit samples annually for analysis—about 12% of our policy-holders are responding, and in about 10% of these the urinalysis is of a nature that would decline them as risks were they to apply for insurance at the present time. A careful record is being kept and perhaps in a few years, if the actuarial difficulties are not too great, I hope that we may be able to submit an experience in this class of old policy-holders with urinary findings that are considered hazardous.

The problem is a most important one. I find in checking up our declinations that over 20% are reported owing to albumin, sugar, casts, blood, or unsatisfactory specific gravity, and in an analysis of several thousand cards reported by other companies, 9.5% were solely for these reasons and 11.6% were for these impairments, combined with others, making a total of 21.1%. This is a large percentage and if we are doing an injustice through too rigid selection—and I think we as well as other companies are—it is important from the standpoint of justice and business that it be corrected.

If applicants with traces of albumin, sugar, and a few casts are accepted by companies at standard rates, I believe it is safe to do so only where the urinalysis is made at the Home Office. Phrases such as "slightest possible trace" or "a

very slight trace" of albumin, etc., as used by Dr. Ogden in his paper are by no means, we have found from experience, synonymous with similar terms used by the examiners in the field.

Dr. Ogden finds some difficulty in interpreting the favorable mortality that his company has experienced among the groups investigated in his studies. Personally I believe this to be due to the thorough and efficient work done in his laboratory. I make the statement because after eight years of observation the more I follow urinalyses as they are conducted in a well-equipped Home Office, the more am I impressed with their tremendous importance not only in detecting bad risks, but in enabling a company to accept applicants that might otherwise be declined.

Dr. Porter—I will call upon Dr. J. A. Patton to continue the discussion of this very interesting subject.

Dr. Patton—Mr. President: The importance of Dr. Ogden's paper was such that, following Dr. Porter's suggestion, I have made a few written statements, and possibly I have been a little more critical than the two gentlemen who preceded me, and yet the criticisms will be intended in good part, and will be taken in good part, I believe.

We have taken a more liberal view of the applicant with something abnormal in his urine during the past two years in our office, and that change has been directly due to the establishment of our Home Office laboratory.

Our thorough chemical and microscopical examination of the urine gives us very much more definite and far-reaching information than we received under our old practice. This experience on our present lines does not extend over enough years to warrant any statistical statement, but we have reasons from it to feel encouraged and this report of Dr. Ogden will strengthen our endeavors to extend the scope of our present methods.

We do not require specimens in as many classes of cases as those named by Dr. Ogden nor is our laboratory examination, in some respects, quite as extensive on the chemical side. We

believe formalin to be the best preservative, having tried chloroform, boric acid, chinolol, and thymol in addition. We use the salt and acetic acid, the Heller's and, at times, the Ullrich tests for albumin, and the Fehling's and phenylhydrazin tests for sugar.

A thousand specimens compared showed that the acetic acid and salt solution was more sensitive than Heller's nitric acid or the Ullrich tests, even with the albumoses excluded.

Kowarsky's modification of the phenylhydrazin test gives us satisfactory results. Use 5 drops phenylhydrazin solution, add 10 drops glacial acetic acid, then 1 cc. saturated salt solution, and then add 2-3 cc. of the urine to the curdy mass and heat 2 or 3 minutes. The yellow glucazon precipitates if  $\frac{1}{2}\%$  glucose is present and is easily seen microscopically. Any crystals with this small amount of urine are pathological.

*Derham's modification of Legal's test.*

Acetone tests are made as follows:

Add to 4 cc. of the urine in a slender test-tube about .3 gm. ammonium chloride, then 2 drops of fresh 5% solution of nitroprusside of sodium, and then with tube at an angle with a pipette allow 8-10 drops of strong ammonia to overlie the mixture. If acetone or aceto-acetic acid be present, the normal white fleecy ring at the juncture of the solutions will become a vivid crimson which rapidly increases in depth and intensity. Creatinin is denoted by a dirty reddish-yellow ring.

We have an eight tube electric centrifuge and have always obtained a satisfactory sediment and have found the centrifuge better than filtration to clear cloudy specimens.

We thoroughly agree with Dr. Ogden that the microscopical findings are much more important than the chemical for diagnosis.

We have made no estimate of the number of laboratory cases we have recommended for regular insurance, but believe it is probably as high as Dr. Ogden's, namely 70%, and this percentage bears out Dr. Ogden's statement made at the Twenty-third Annual Meeting of this Association.

It would be interesting to know what classification Dr. Ogden has established for taking those of the remaining 29% he considers substandard or uninsurable risks, but we recognize that is outside his present report. All percentages mentioned in this discussion are by number based upon the American experience.

Group 1, cases of mild renal congestion with faint traces of albumin, group 2, bladder or urethral cases, and group 3, slight renal disturbance but no albumin, should be readily diagnosed with careful history and after two or three urinalyses, but the 53% shown in group 1 is 8 points above the average reported.

Group 4, low specific gravity and solids, should call for careful history, elimination of nervousness or excessive ingestion of liquids in order to shut out possible interstitial nephritis and for three or four careful chemical and microscopical urinalyses to maintain or to decrease the 50% reported.

Group 5, low solids with signs of bladder and urethral disturbance and slight trace of albumin, is more liable to have cases of interstitial nephritis and calls for repeated analyses in addition to a special report by a well-known examiner after instructions from the Home Office, if the 51% experience is to be maintained.

Group 6, concentrated urines with slight trace of albumin, is composed of cases due to the effect of the heavy urine and therefore relatively unimportant if a second specimen shows nothing more unfavorable.

Group 7 is similar to group 1, but shows more severe renal irritation and requires a few weeks' delay for subsequent analyses and the cases then are not insurable unless the later analyses are more favorable, and these methods alone will keep the results at or near the average mortality.

Group 8 is a severe form of group 1, requires three months postponement, and if no casts are then found on several analyses, the cases are acceptable. These results show no organic renal disease present, but experienced judgment is necessary and here blood pressure should prove of marked value. It is

believed that further experience with this group will show a much larger mortality.

Group 9 is similar to group 4, but with later urinalyses showing about normal solids. Undoubtedly the poor history furnished from the field gave insufficient basis for the action taken and unless this can be remedied the mortality rate of 72% will not be lowered.

Group 11 or temporary glycosurias should be carefully selected and the high mortality shown during the earlier years of exposure proves this. Certainly several analyses during a period of three or four months should be required and a very thorough case history as to diet, possible treatment, etc., should be obtained and in some cases the diet test should be made.

The true glycosuriac is never a good standard risk and it will be difficult, if not impossible, to make selection certain enough to maintain the 59% shown in this group.

The average of claims in 19,564 cases in ten years by number was 45% of the American table and this was exceeded in groups 1, 4, 5, 7, 9, and 11, and these, with the exception of 7, also show larger percentages than the company's ordinary claim results of 50.26% for the same years; hence they have tended to increase the general claim percentage. We must agree with Dr. Ogden's statement that fifteen or twenty years' experience will show a larger average than 45%, for he stated in 1912, after six and one half years' experience with 9000 cases, that the average mortality was 37% and no group then ran above 45%. The favorable 30% for the first year and 43% for the first four years show the elimination of the established renal diseased cases and only the fifth, sixth, and ninth years are out of proportion.

Age group 13-27 shows groups 1, 5, 6 and 9 above 45%, the latter being 72%.

Age group 28-42 shows groups 1, 4, 5, 7, and 9 above 45%, but none above 55%.

Age group 43-57 shows the highest average which is due to groups 4, 7, 9, and 11, and all being above the average of

45% indicates that at these ages the abnormal conditions are more definitely established or the applicant's resistance is more markedly decreased; hence we must exercise greater care at ages beyond 40.

The grouping shown by Dr. Ogden illustrates the irregular limits one must place in making a classification and how one group runs into or encroaches upon another.

It has been our attempt to obtain sufficient analyses and other information in each individual case to make a diagnosis from the clinical side and we are following along these lines.

1. Is a true renal disease present or are the abnormal findings due to disturbances of some other portions of the genito-urinary tract?

2. What effect have the urinary and circulatory systems on each other in this particular case or in the production of the conditions indicated by our laboratory findings?

3. What effect have this applicant's habits of eating and drinking, his occupation, mental or physical, his temperament and living conditions, etc., on his urinary secretions? We thus supplement the examination and laboratory with a thorough inspection.

4. Careful history of past G.-U. inflammatory trouble below the kidney or any present signs of chronic inflammation.

5. Glycosurias are always considered substandard, but we attempt to determine whether or no the condition is temporary or is a true diabetes.

6. The atypical cases with inconstant findings are probably due to the less common unilateral diseases as hydro- or pyonephrosis. We consider no case showing any urinary abnormality as being fully standard or first class, though some of them might be classed as average from the point of resistance and probable longevity.

We recently reviewed 5000 ordinary rejections, upon which other insurance was in force, and the following results show what effect upon our mortality the acceptance of these cases would have had. These rejections all occurred during the period when our action was more conservative than at present,



but also when we were not attempting to determine the cause or source of the abnormal urinary findings.

	Policy Year	Exposed to Risk	Expected Loss	Actual Loss	P. C.
Albuminuria.....	1- 5	3,507	41,029	109	265.67
	6-21	1,557	21,963	45	204.89
	Total	5,064	62,992	154	244.48
Glycosuria.....	1- 5	1,068	13,609	26	191.05
	6-17	589	9,989	15	150.17
	Total	1,657	23,598	41	173.74
Genito-urinary..... Albuminuria, casts, glycosuria, per- sistent low speci- fic gravity.....	1- 5	4,818	57,861	131	226.40
	6-21	2,262	33,131	61	184.12
	Total	7,080	90,992	192	211.01

Dr. Patton—Within the past year we have taken quite a number of cases where a very faint trace of albumin is shown. We have taken them at standard rates, although we do not feel that they are first-class applicants for insurance.

Dr. Porter—How about casts?

Dr. Patton—One or two hyaline casts only; if more, we get a second urinalysis; if the casts continue, we postpone action.

Dr. Weisse—How about the class of cases that have been reported for casts repeatedly in the past, in which you find hyaline casts in the first specimen?

Dr. Patton—We rarely get a second. There is one other point in connection with Dr. Ogden's paper that impressed me. The question is, what has become of those cases that were accepted, that lapsed? What was the mortality among those lapsed cases? As I understand his statement there, the lapses have been accounted for, they have been dropped out of the number of exposures, but it would be interesting to



know what has become of the lapsed cases, and what was the mortality. That of course is difficult and probably an impossibility. But how much would the mortality have been increased if that could be obtained? It is an important question to wonder about, at any rate.

Dr. Porter—I will next call upon Dr. R. M. Daley to continue this discussion, and to give us the experience of the laboratory of the Equitable Life.

Dr. Daley—Mr. President and Gentlemen: Dr. Ogden's paper furnishes such a large field for discussion that it is difficult to know where to begin without adequate preparation, and I am sorry to say I have not that preparation. The Equitable has had a laboratory for fifteen years, and in that time has had all specimens of urine examined there when there has been a previous history of albumin, when the amount reached a certain figure, \$50,000, or when in the judgment of the Medical Director it was required—a personal or family history of arterial sclerosis, etc. During that time we have examined something over 100,000 specimens. Now right here comes in a point which I wish to emphasize, and that is the necessity of standardizing our terms—slight amount, faint trace, hyaline cast, cylindroid. Is a cylindroid of one chemist a hyaline cast of another? It usually is, I am sorry to say, and there will be a field for wide divergence in the reports of subsequent papers, unless a standard of nomenclature is adopted by this Association, stating exactly what is meant by a slight trace of albumin—that is, such a thickness of albumin produced by contact test, of three, four, five, or ten minutes' duration, etc. Exactly what is a hyaline cast? I believe and recommend that this Association adopt some proper nomenclature for describing these conditions.

But to go on. . . . Dr. Ogden's paper shows that the cases he reported could hardly be considered kidney impairments. A great majority of those cases were impairments below the kidney, that is irritation from a highly concentrated urine, irritation from intestinal sources, etc. Dr. Patton's critical review of Dr. Ogden's paper, I heartily endorse, for

we must not be led astray in thinking we can take cases with albumin and casts at standard rates. It cannot be done, and our experience in the substandard class demonstrates that it cannot be done. We have had our most favorable mortality in the class of cases which go just beyond the borderline of those that Dr. Ogden describes, that is, those with the faint trace of albumin with occasional hyaline cast, persistent, because we do not go on the finding of one specimen, we usually have two or three or four, our examinations occasionally extending over a period of one month. We do not examine for urea. Not obtaining twenty-four hour specimens we feel that our findings in that respect are very apt to give us inconclusive results. The taking of a specimen at different times of the day makes a great deal of difference in the solids and in the specific gravity. We all know, as Dr. Muhlberg pointed out, that after excessive exercise you get casts in the urine in a kidney which is otherwise perfectly healthy and which excretes normal urine the next day. Fortunately we now have the blood pressure test to help us in eliminating chronic diffuse nephritis. It has proved a great help to us in the substandard business as well as in the standard.

Dr. Symonds—Mr. President and Gentlemen: My remarks are entirely extempore because I have not had time to go over this splendid paper of Dr. Ogden's until this morning. It is a magnificent piece of work. Taking up the groups individually, it seemed to me as I ran over them that a great many of the groups have been picked with a great deal of care. Take that very first group, the remarks that Dr. Ogden made were—a first-class history in every respect, comparatively young people, under forty years of age, amount of insurance applied for and given usually small. In that very group itself, the mortality was rather above the average of the company's excellent mortality for the same period of time, and the causes of death as summarized by Dr. Ogden showed that about one third of them might be ascribed to some condition either of the renal or of the cardio-vascular apparatus—a much larger percentage than I noted as I ran over the causes of

death in the other groups, for in them they ranged from one sixth to one eighth of the renal and cardio-vascular type, and I think we must pay some attention to the terminal process in these cases, otherwise we are apt to get into a mistaken idea concerning them. Undoubtedly some of these cases of Dr. Ogden's that were taken in the first group were cases which were just beginning nephritis and which ended in that way. They terminated in the regular way but they were so carefully selected that a fairly good mortality was obtained, though only fairly good. Now if we forget the fact that a good many of these cases do run into nephritis we are apt to begin to take them rather freely on the idea that they are not of much consequence, that the impairments noted are not very serious ones, whereas on the contrary they are serious, and it is only by making a very careful selection that Dr. Ogden has been able to obtain the satisfactory results that he has given. I think that the causes of death, in other words, should be studied in these cases, for they are of value in indicating the way in which they died, and the fact that the cases are distinctly impaired. The paper as a whole is a very excellent one. It is rather too long for one who has only read it this morning to discuss properly, and that brings up a point, Mr. President, which I would like to present to the Association now—whether it would not be possible to have these papers printed and distributed to the members of the Association a month or so in advance of the meeting, so that the entire Association can come and discuss papers like this properly and intelligently. A paper of this size and magnitude, with the amount of statistical material contained in it, is impossible to discuss on one reading only, and I would like to ask whether that cannot be done. Would it affect the attendance on the meetings in any way? Of course we do not want to do anything of that kind, but would it not be possible for us to have these papers sent in a month or two earlier, have them printed and distributed, and then have them discussed, the writer of the paper making a comparatively short abstract for an introduction to the discussion? I would like to have this plan

considered by the Association, because really part of the program yesterday did become very long and very hard to handle, and it was partly due to the fact that a good many members of the Association had not seen the papers beforehand, and were therefore deprived of the privilege of going over them carefully before they were read.

Dr. Porter—Dr. Symonds's suggestion is an excellent one, and I would like to take it up. I think it is of very great importance to the Association to determine the best course. I have some definite views on this subject which I will mention in introducing it later. We will now continue the discussion of Dr. Ogden's paper. On occasions of this sort I have always made it a point to study faces carefully. I have been watching the faces about the room, and there was one face which was very much alive during the discussion, bearing upon the acceptance or non-acceptance of risks at standard rates, with the presence of albumin or casts, so I am going to call upon Dr. Dwight who has given us some valuable information in the past, who has very decided views, to give us a repetition of the position he has taken or to tell us if it has varied any from last year or the last meeting. Dr. Dwight, a few words, if you will.

Dr. Dwight—Mr. President and Gentlemen: I am accustomed to being called upon whenever this subject is broached, I am accustomed to the criticisms which are always made of the people who take a position or apparently take a position similar to that of the New England Mutual, but for the first time I think at one of our meetings I now represent the conservatives along this line. Dr. Ogden's paper I think is a remarkable one, because it is the first one, so far as I know, which has ever dealt statistically and pretty completely with this subject of urinary analyses, those analyses being made for life insurance companies along somewhat similar lines to those of the New England Mutual. Also, if I am not mistaken, it includes a larger experience than has ever been published, and the statistics have the great advantage of being accurate and of being to a considerable extent homogeneous. I am

exceedingly sorry that the New England Mutual cannot give its figures now. I hope that sometime in the future Dr. Blakely will not be hampered by the fact that he is working for a small company where a good deal of this work is done in the Medical Department and where during this particular year we were short of clerks.

I am not going to say much about the quality of Dr. Ogden's paper for the reason that I cannot in five minutes do it justice. It deserves too many compliments even for ten minutes; but I think we owe a great deal to Dr. Ogden, and I think that five years from to-day the Association will appreciate to a very much greater extent than it does now what its value really is. I am interested in seeing that with the same methods—his technique is almost exactly that of the New England Mutual—he has arrived at reasonable results. He is much more surprised at his results than I am. Dr. Blakely has covered that ground pretty well, but I want to lay this stress upon the solids. These gentlemen who have spoken and who differ with Dr. Ogden or who are not in line with him acknowledge to begin with that they have never had the experience to justify a very strong difference of opinion. They start off with the assumption that the solids in the urea cannot be taken, or if they can be taken they are not worth while under the conditions with which we have to work. If they will try the experiment sometime, perhaps they will change their opinion. But Dr. Ogden has gone much further than we have. Dr. Ogden is not as conservative as the New England Mutual, particularly with reference to the solids and to the specific gravity. As Dr. Blakely has said, we have had a large experience with cases which, so far as I can judge, Dr. Ogden would have accepted, and a good many of those cases have gone wrong and a good many of those cases are for large amounts. Dr. Blakely has said that we consider them the most dangerous. We do—we consider them very much the most dangerous class with which we have to deal. I am surprised that Dr. Ogden has gotten such a low mortality with several of his classes. So far as sugars are concerned, his results are almost

exactly the same as ours. We know that there are cases with a history of sugar that are good risks. We know that included in a thousand individuals with a history of sugar found once, small amount, unknown cause, and no symptoms, there must be a large number which we could take and have good results provided we could pick them. We have not been able to pick them. We have tried all the tests which so far as I know any of you gentlemen have tried and we cannot get them. We hope to grow intelligent in the future and we are struggling with it but we are getting it down so that now it almost means a rejection if sugar has been definitely found in the urine in the past.

The question of terminology is I think of some importance, and it may be of a little interest to you to know how we are handling it. Dr. Blakely overlooked one point in connection with our technique. We have given up having samples of urine sent to the Home Office of our company, for various reasons which will be apparent to most of you because most of you who do have specimens sent to the Home Office have undoubtedly had the experience which caused us to change our method. We have appointed thirty-two chemists who are scattered around the country. So near as we can judge they are laboratory men. They are appointed as chemists and their opinions are not considered nor asked for. They give us simply their technical findings in the urine. They know nothing about the specimens as they come to them; they are given the urine which is certified to as to its authenticity and they tell us what they find. In that connection, Dr. Blakely's figures showing the great difference between those which were apparently normal and those which were extremely doubtful at the start are very interesting and an admirable answer to the statements of the agents as well as of many doctors that a chemist can find albumin and casts in any urine. However, it became immediately apparent that we must have a terminology, that we must all use the same terms, and accordingly we instructed our chemists in this way: We recognized that there was a difference of opinion as

to certain forms of proteids. We said—the albumin which we want you to report is that which you find on cold contact with nitric acid, never mind about the rest of it, report that. The “slightest possible trace” means in our vocabulary the smallest possible amount which the trained man can recognize as being present. You cannot say one sixty-fourth of an inch or one thousandth of an inch, you cannot measure it by anything except that it is there. That is the “slightest possible trace of albumin.” Then we told them that we did not care for the use of the term cylindroid, that if the object which they saw represented the mold of a renal tubule, call it a cast; if it represented a plug from the prostate or somewhere else, do not call it either a cylindroid or a cast; do not use the word cylindroid at all; if it is a mold of a renal tubule or any portion of such a mold, call it a cast. Now the results are astonishingly even from all of those men.

I am impressed again, as I always am when I hear statistics quoted in this Association, that no matter what the group is, no matter how it is selected, no matter who the man is, provided it is properly selected and he is an accurate man, the results will either agree with ours which we have made independently or they will come so near to it that the variations are very easily accounted for. Now Dr. Ogden has had slight variations. He has had higher mortalities in certain groups than he has expected and higher mortalities than we believe we have obtained, and as Dr. Symonds says, a little higher than his average in some groups, and I believe the reason lies in the fact that his company is more generous than we are. In the first place he takes cases with albumin and with casts when the albumin and casts presumably come through the kidney at the final examination. We do not take such cases. In the second place, he takes cases with low specific gravity—what we call low specific gravity, down to 12 or 15. We take nothing in a doubtful risk less than 1020. Thirdly, he takes those with what we call a low urea down to 1.5. We do not. It seems to those of you gentlemen who have not tried this urea business in connection with your life



insurance work that it is rather finical to talk of a difference between 1.5 and 1.8, but it is not. The only kind of cases that we have any trouble with are those right on the borderline. We have a rule, 1020 with urea 1.7. If it does not measure up to that our chemist stops the examination, he does not complete it, he does not give me a chance to pass on it—I don't want a chance to pass on it, because I don't want to have it go through the Executive Offices. But the cases that we are sorry we took, were just 1020 with urea 1.7, no albumin or casts. Dr. Blakely is perfectly right in saying that we have for thirteen or fourteen years seen cases go through our mill that gave us, specimen after specimen, specific gravity 1018, urea 1.5, no albumin, no casts, no anything—absolutely straight; but they cannot give us one with 1022, urea 1.8—I don't know why but they do not do it, and our results, so far as we can judge, entirely justify our methods. There is this warning: Don't think because you are having samples of urine sent to the Home Office that you are applying the same tests as the Metropolitan; don't think if you leave urea out of it that you are doing the same work or can follow the same lines that Dr. Odgen follows. I question very much whether we have reached the stage when two or three hyaline casts can be accepted with freedom, and eight or ten cannot. I do not even attempt to make a distinction and we have had lots of applicants who have only had two or three casts and have died within one or two years of circulatory disease. I could go on as you see almost indefinitely, but I do want to make these points and to have you recognize this fact, that I do not believe that those gentlemen with experience much greater than mine, with companies much larger than the New England Mutual, who say that urea is of no value, are quite qualified to express that opinion until they have tried it.

Dr. Porter—The subject is open for general discussion, and I hope the discussion may be very active, and as the hour is getting rather late I shall have to hold to three or five minute limitations, but I do hope that we will have a response to this call for general discussion of this all important subject.



Dr. Muhlberg—Can we not take some action on Dr. Daley's suggestion that the terminology be standardized? I think that is a very important suggestion, and I believe that our researches and our studies in the future will be of little value unless some such standardization be made.

Dr. Porter—The suggestion is a good one, that the terminology be standardized for our general adoption. Are there any remarks bearing upon this suggestion, which has not yet been put in the form of a motion?

Dr. Wells—I believe that the point just brought out is one of the strongest in this discussion. In our own Society we do not as yet feel that we can disregard the presence of albumin and casts; certainly when albumin is detected, the question naturally arises as to whether the kidneys are involved, and to what extent. Still further, what does a record of albumin, extending back possibly over several years, mean? Was the albumin referred to a mere trace, or present in large amount?

I believe that the nomenclature and meaning of these terms should be standardized as far as possible. It is certainly a subject worth considering and studying. As we have a Committee on Blood Pressure, I would like to move that a committee of five be appointed by the Chair to study specially the question of standardizing the nomenclature of urinary terms and to report their conclusions or recommendations to the Association.

Motion seconded by Dr. Muhlberg and carried.

Dr. Patton—If Dr. Dwight understood that we did not believe in taking the urea, I wish to explain that we have not yet reached the stage where we can put it into effect. We are now examining five hundred specimens in a month at our office and one man alone is doing the work, and it is really more than we can arrange to take care of. I am of the opinion personally that the amount of urea is just as valuable in any specimen as specific gravity, and that the two should be taken together in connection with other features. It is our hope

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and expectation to reach that stage of the work later at our office.

Dr. Porter—We are fortunate in having with us Mr. Craig, and he has taken such an active part in the statistical work of Dr. Ogden's paper that I am sure we would all be very glad to have a few remarks from him from his standpoint. Mr. Craig, will you honor us with a few words?

Mr. Craig—Mr. Chairman, I simply came down to supplement Dr. Ogden, as he was a little bit fearful that in case you got into a statistical discussion he might need assistance. I can simply say that I have appreciated my study and work with the Doctor. We have tried to make the study as complete as possible. I notice some discussion relative to the causes of death, and too much importance being placed on the relatively light mortality; but we wanted to make that clear, we wanted to bring out that the business had been placed along normal lines, that there was no small percentage of Whole Life policies and large percentage of Endowments. We tried to give you a complete picture, and in case you had studied the statistics so efficiently and had found any flaw, he asked me to come down and help him out.

Dr. J. B. Hall—I am very much interested in this paper of Dr. Ogden's. It would take a great deal of study to be able to speak about it, except that I would like to say that I do not think that the smaller companies of the Association, such as my own, can afford to go deeply into this more or less experimental medical selection of the albuminuria classes. We have not a large mass of normal business to place against the possible high mortality to be derived therefrom. We cannot expect to give it the scientific attention that Dr. Ogden and his able force have given it. When I was in the hospital service I was interested in a class of cases where a number of men—I think twelve—had very severe burns. All of these men showed albumin and casts in the urine and those who think that albumin and casts do not amount to much would say that it was a temporary matter caused by the burns and they recovered, and of course they did recover; but those who

think that albumin and casts are pathological claim that there was certainly a secondary congestion of the kidneys caused by the burns, and that these men were certainly not in good condition. The matter can be taken both ways, but I wish to say just a word of caution. I do not think that the smaller companies can afford to go too deeply into experimental medical selection.

Dr. Ogden (closing the discussion)—Mr. President and Gentlemen: I have been most gratified to find such a good discussion of my paper. I will take up a few of the points that have been touched upon. Dr. Blakely has referred to sediments and the term "satisfactory sediments." If we examine a centrifugalized sample, 15 c.c., and find nothing, we allow this urine to settle by gravity and we examine the sediment after that sediment has been centrifugalized. In other words, we have a concentrated sediment. There may be anywhere from one to three or four preparations made from that sediment, and the resulting slides are very carefully examined. I do not want you to be misled by what I said about the length of time that we devote to a microscopical examination of the sediment. There are circumstances under which six or eight an hour would be too many, but, striking an average, we have found that about six to eight can be satisfactorily examined. That does not mean that we time each microscopist; we pay no attention to the time; these men have work to do and they do it; if you should ask any one of them how many sediments he examined in an hour I presume he could not tell you, but I have watched them, unbeknown to them, and the results have turned out as stated.

We have made a special effort not to have over-refined methods. The moment we become over-refined we lose good insurance business. I mean, we are in business to take risks and we cannot afford to be over-refined. We want to be fair in our work.

The matter of solids is a very important one. As pointed out by Dr. Dwight and by Dr. Blakely, we have possibly been a little more lenient in the matter of solids than the New

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England Mutual Life. Perhaps in time we will find that we must be a little more careful. We are waiting to have that and a good many other things demonstrated. These percentages that I have given you are bound to change. Some classes will have higher and some classes will have lower figures than I have given you.

I have been especially impressed with the close figures between the New England Mutual and the Metropolitan as to the approximate number of acceptances. They accept something like 63% and we about 68%. That is a strange coincidence. I had no idea what the New England Mutual was doing, and I do not know that they had any idea what the Metropolitan was doing, until a year or two ago when Dr. Blakely and I had some talk and some correspondence on the subject.

Referring to Dr. Muhlberg's statement about chronic interstitial nephritis, of course we do know that chronic interstitial nephritis may run its entire course without urinary signs and occasionally without physical signs, but there is one thing that we have to consider in cases of chronic interstitial nephritis, and that is that the average run of an interstitial nephritis is from twenty to thirty years. A thirty-years' experience constitutes fine insurance business. Just what our average is going to be at that time I do not know, but we can afford to take a few of these risks, and we have felt that we were on fairly safe ground with these young people without any apparent physical defects.

I am very glad, Mr. President, that this matter of urinary terms has come up. We certainly need to get together and then we shall be talking about the same thing and our results will be uniform.

Dr. Patton brought up the matter of lapses. I do not know whether or not Mr. Craig could tell us anything about what has happened to these lapses.

Mr. Craig—The question of lapses is a wide-open one on all policies, and actuaries have investigated them as much as they can, but it is hard to keep track of a policy after it has

lapsed. We do not know just when they die and we have not anything definite either on the total business or on these urinary cases.

Dr. Ogden—I wish to thank you, gentlemen, for your kind attention and for your very interesting discussion, and I only hope that we can expand and enlarge the work that we have started and that valuable and more valuable results will follow.

Dr. Porter—We will now take up the suggestion made by Dr. Symonds with reference to a plan for the discussion of papers another year, which was, that copies of papers be distributed a month in advance of their reading. The plan is an excellent one. This year, notices of the papers that were to be read were sent out to each member three months in advance of the meeting. A filing card was enclosed with each notice, so that in replying all that a member was required to do was to indicate by number on the card the paper which he desired to discuss. The result, as evidenced by our program, was most satisfactory. Great difficulty was experienced, as in previous years, in obtaining the completed manuscripts in time to enable the printer to have them ready for distribution before the meeting. In order to carry out satisfactorily the suggestions made, it is essential that all manuscripts be in the hands of the Secretary by August 1st. It is possible that having the main part of the scientific contributions in their possession in advance, certain members might fail to attend the meeting, resulting in a smaller attendance both for our scientific and social session. This, however, to my mind, need not be used as an argument against the adoption of the proposed plan. The question is now open for discussion, and I should be pleased to have any suggestions or motions that you may care to present.

Dr. Beckett—I think it would be well, at least, to request the writers of papers to send copies to those who are to discuss the papers, at least one month in advance. It is rather embarrassing to try to discuss a paper about which you have had no previous knowledge. Some of us did not receive the papers until we came in to the meeting.

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Dr. Porter—Your location was responsible for that, Dr. Beckett. We could not get the paper to you in time.

Dr. Beckett—That might of course be true, but if the writer of the paper knows who are to discuss that paper, he can at least send a synopsis of the paper to them in advance, and I think that at least should be done, and I believe that if a synopsis could be sent to each member it would be very much more interesting and would call out, if anything, a fuller attendance.

Dr. Porter—Any further remarks? I would like to hear from Dr. Wells.

Dr. Wells—I feel that the question of attendance at the meetings of this Association is of the utmost importance. If an organization is to exist, maintain an influence, and do good work, interest should certainly be taken in it, and each Company in the Association should be represented at these annual meetings. It may not be possible for more than one representative to attend, but every Company should at least be so represented, otherwise the enthusiasm is going to diminish and the work be interfered with. I think this is a matter of duty. Our Executives should be informed of what is being accomplished and of the importance of this organization. I have reason to believe that some Executive Officers do not understand just what this organization stands for, what it is doing, and what it means to the Life Insurance business. I am sure if they did fully understand that, they would back our organization and encourage it, perhaps more enthusiastically than they do at the present time.

I doubt very much whether it would be possible to send a copy of the papers, which are to be read, to every member of the Association in advance. If each member did receive a copy, we would have so many taking part that I doubt the possibility of getting through the program; but if we could have the papers, say a month in advance, and, as Dr. Beckett has suggested, in the hands of those who are going to discuss them, it would certainly add greatly to the discussion. No one can discuss a paper well on the spur of the moment—at least, not so well as if he had had time to think it over, study

and digest it. It is only fair to the person who is to review the paper that that plan should be followed, and then it occurs to me that possibly an abstract or an epitome of each paper could be sent around to each member, letting them know just about the line of thought. That might be worked out. I think that Dr. Porter's plan for this year, of sending to each member a copy of the program, announcing the subjects and asking each one to select some topic to discuss, is a very excellent one indeed, and we can enlarge on that perhaps during the coming year. I am convinced that first and foremost we should maintain an interest in this Association, aim to attend its meetings and contribute something to its program. By all means let us work out some plan by which each one may be informed of what is to take place at the annual meeting, and that those who are to discuss the papers may have ample time to review them before they are read.

Dr. Porter—It has occurred to me in the course of these remarks, that it would be desirable to have the proposed readers of papers notify the Secretary what portions of the subjects they, themselves, would like to have brought out in discussion. Such notice to be mailed to all members three months in advance of the meeting. That would enable the members to decide which subject they might care to discuss, and reply filing cards could be forwarded, as was done this year.

Dr. Symonds—I arise on behalf of the man who is taking part in the general discussion, not those prepared discussers who have the papers beforehand, sometimes a day and sometimes a month; but I am pleading for the man who has not seen the paper at all. These papers are becoming more and more statistical and more and more difficult to discuss intelligently without preliminary study, and while three or four men may be authorized and appointed to discuss a paper, yet the general membership of the Association does not get a good understanding of the papers in the limited time in which they are read and discussed. It seems to me that the authors of the papers could in most cases furnish them to the Secretary



two months beforehand. That would make it possible to put them in galley proof and distribute them when the notices go out for the regular meeting, which is usually about thirty days in advance. I think it could be done. It would mean perhaps a little more effort on the part of the author, because he will have ten months, instead of twelve, and it will mean a little more push on his part, but I think he could do it; and I think it certainly would add greatly to the interest of the men who are coming to the meeting. Those who say that they will not come because they have the papers beforehand can hardly make that a point, because two or three months after the meeting they get the papers printed in solid form with the discussions, and if a man wants to stay away because he has the papers before him, there is really nothing to bring him here. So far as the social aspect of the case is concerned, if a man is going to attend one of your dinners, Dr. Porter, he will come anyhow. But I do believe that the man who wants to take part in the general discussion has no time to study the papers as they come in now; and in order to bring the matter into concrete shape I would move that the authors of papers be required to furnish them to the Secretary two months in advance of the date of the annual meeting.

Motion was seconded and carried.

Dr. Gordon Wilson—This was tried out before the Association of American Optometrists. They found they were a little late in getting the papers, but it did not cut down the attendance the slightest bit; they got the papers in time for the men to read and digest them, and the meetings were far more pleasant—the discussions were to the point, and the attendance of the meetings improved.

Dr. Root then announced the result of balloting for the election of officers as follows:



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### PRESIDENT

DR. F. C. WELLS

### FIRST VICE-PRESIDENT

DR. HOMER GAGE

### SECOND VICE-PRESIDENT

DR. W. A. JAQUITH

### SECRETARY

DR. FANEUIL S. WEISSE

### TREASURER

DR. AUGUSTUS S. KNIGHT

### EXECUTIVE COUNCIL

DR. EDWIN W. DWIGHT

DR. A. B. WRIGHT

DR. GEORGE A. VAN WAGENEN

Dr. Fisher then presented the report of the Committee on Blood Pressure, as follows:

#### FURTHER REPORT OF THE DIAGNOSTIC VALUE OF THE SYSTOLIC BLOOD PRESSURE COVERING A PERIOD FROM AUGUST 1, 1907, TO AUGUST 1, 1915.

The following tables fully explain the class of cases under observation.

In Table I. will be found the mortality of 2635 accepted risks, ages 40 to 60, average pressure 142.43 mm. Hg. Mortality 93.16 per cent. It will be recalled in our report of 1914, the mortality of the data contained in Table I. was 74.15 per cent.

In the 521 risks (Table II.) accepted during years 1907-

1910 (mortality computed to August, 1915), a mortality of 127 per cent. of the Medico-Actuarial table is shown, which is 47 per cent. above the general average mortality of the company. In 302 cases rejected during the same years, with no other impairment (blood pressure average 170 mm.), the mortality was 150 per cent. above the table and more than three times the general average mortality of the company. In the 288 risks rejected, in which there was one or more other impairments found at the time of the examination, the mortality was 302 per cent. of the table, almost four times the general average mortality of the company covering the same period. See Table X.

We find in both classes of rejected risks, identically the same class of impairments. Between 75 and 80 per cent. of the impairments recorded at the time of the examination and those that were subsequently discovered or had developed since the examination, were cardiovascular, and of the 191 deaths occurring in the rejected risks, with high blood pressure, 78 per cent. were due to cardiovascular diseases. A record of 440 risks rejected, below age 40, shows 77 per cent. of the impairments were cardiovascular. See Table VI.

A record of 627 risks, ages 40 to 60, with a low systolic pressure, accepted by the company during the years August, 1907-1910 (mortality computed to August, 1915), shows a mortality considerably below the table. Two hundred of these had a blood pressure of 105 mm. and below, and 427 a pressure of 106-110 mm. 493 risks were accepted from November, 1911, to August, 1915, with a blood pressure of 100 mm. and under. 433 of these were under age 40, with only two deaths. Sixty were ages 40 to 60, with no deaths. See Table X.

In Table VIII. the mortality is shown to progressively increase with the increase of each 10 mm. of blood pressure. The systolic blood pressure will average about 4 mm. higher when taken by the auscultatory method. The blood pressure readings in these statistics were adjusted to the palpatory method.

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TABLE I.

MORTALITY OF ACCEPTED RISKS WITH SYSTOLIC BLOOD PRESSURE OF 140-149 mm. Hg., WITH AN AVERAGE OF 142.43 mm. Hg. AGES 40-60. TO AUGUST 1, 1915. (M.-A. TABLE.)

Under Age 40				40-44			45-49			50-53		
Years	No.	Exp.	Actual	No.	Exp.	Act.	No.	Exp.	Act.	No.	Exp.	Act.
1907	4	.115	0	64	3.399	2	74	5.520	4	38	4.097	4
1908	4	.140	0	200	9.367	6	219	14.083	11	106	9.418	17
1909	9	.239	0	333	12.931	8	325	17.610	12	164	12.682	10
1910	12	.278	0	274	8.522	10	274	11.630	14	151	9.611	6
Total	29	.772	0	871	34.219	26	892	48.843	41	459	35.808	37
Per cent.				75.98%			83.94%			103.33%		

54-56				57-60			Total			
Years	No.	Exp.	Actual	No.	Exp.	Actual	No.	Expected	Actual	%
1907	20	3.051	3	16	3.281	5	212	19.348	18	93.03
1908	70	9.021	7	55	8.209	8	650	50.098	49	97.81
1909	66	6.866	8	62	8.247	10	950	58.336	48	82.28
1910	59	4.623	6	65	7.431	7	823	41.817	43	102.83
Total	215	23.561	37	198	27.168	30	2635	169.599	158	93.16
Per cent.				101.86%			110.42%			

TABLE II.

ACTUAL MORTALITY TO AUGUST 1, 1915, AS COMPARED WITH EXPECTED  
ACCORDING TO THE MEDICO-ACTUARIAL TABLE.

Mortality of Accepted Risks by ages at entry 40-60 and years of issue  
(1907-1910) with Systolic Blood Pressure of 150 mm. Hg., and  
over. Average 152.58 mm. Hg.

<i>Ages 40-44</i>				<i>Ages 45-49</i>			<i>Ages 50-53</i>		
Year	No.	Exp.	Act.	No.	Exp.	Act.	No.	Exp.	Act.
1907	15	.751	1	31	2.439	2	20	1.875	5
1908	46	2.150	1	58	3.649	7	52	4.217	6
1909	33	1.238	1	46	2.425	3	37	2.717	0
1910	10	.279	2	21	.873	1	12	.632	1
Total	104	4.418	5	156	9.386	13	121	9.441	12
Percentage by age		113.17%		138.50%			127.10%		

<i>Ages 54-56</i>				<i>Ages 57-60</i>			<i>Total</i>			
Year	No.	Exp.	Act.	No.	Exp.	Act.	No.	Exp.	Act.	%
1907	9	1.127	2	11	1.840	3	86	8.032	13	161.85
1908	26	2.903	2	27	4.186	7	209	17.105	23	134.46
1909	19	1.764	2	27	3.333	1	162	11.477	7	60.99
1910	13	1.005	2	8	.853	2	64	3.642	8	219.16
Total	67	6.799	8	73	10.212	13	521	40.256	51	126.69
Percentage by age		117.66%		127.30%						

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TABLE III.

MORTALITY OF APPLICANTS REJECTED WITH HIGH BLOOD PRESSURE ONLY.  
(Average 160.99 mm. Hg.)

Ages 40-44				Ages 45-49			Ages 50-53		
Year	No.	Exp.	Act.	No.	Exp.	Act.	No.	Exp.	Act.
1907	1	.059	0	9	.673	5	5	.601	0
1908	10	.318	2	17	1.078	3	14	1.216	3
1909	15	.587	0	26	1.285	5	29	2.153	4
1910	18	.549	1	31	1.244	4	29	1.680	3
1911	34	.766	2	37	1.163	1	32	1.408	2
1912	65	1.003	2	66	1.366	4	63	1.894	2
1913	46	.396	4	60	.702	1	45	.784	2
1914	41	.131	0	50	.212	1	33	.197	2
1915	30	.035		35	.066	0	30	.069	0
Total	260	3.844	11	331	7.789	24	280	10.002	18
Percentage by age		286.16%			308.12%			179.96%	

Ages 54-56				Ages 57-60			Total			
Year	No.	Exp.	Act.	No.	Exp.	Act.	No.	Exp.	Act.	%
1907	4	.471	2	5	.820	2	24	2.624	9	342.99
1908	11	1.307	1	8	1.184	4	60	5.103	13	254.75
1909	17	1.486	7	12	1.399	5	99	6.910	21	303.91
1910	18	1.414	1	23	2.432	3	119	7.319	12	163.96
1911	24	1.386	2	19	1.409	4	146	6.132	11	179.39
1912	32	1.273	1	31	1.878	1	257	7.414	10	134.88
1913	35	.776	3	51	1.591	2	237	4.249	12	282.42
1914	32	.262	0	40	.461	0	196	1.263	3	237.53
1915	15	.045	0	26	.114	0	136	.329	0	0
Total	188	8.420	17	215	11.288	21	1274	41.343	91	220.11
Percentage by age		201.90%			186.03%					

TABLE III.—Continued

Impairments Subsequently Discovered or Developed. In the 1274 Cases Rejected for High Blood Pressure Only—Ages 40-60. Mortality to August 1, 1915 (M. A. Table). Average Systolic Blood Pressure 159.07 mm. Hg.

Arteriosclerosis Atheroma	Heart Murmur	Heart Hypertrophy	Albumin and Sugar	Albumin in Urine	Sugar in Urine	Albumin and Casts	Cast in Urine	Nervous Symptoms	Prostatic Disease	Miscellaneous	Total	Expected Deaths	Actual Deaths	Per Cent.
29	36	9	6	114	13	105	65	21	1	37	436	17.501	38	217.13

TABLE IV.

MORTALITY TO AUGUST 1, 1915, OF APPLICANTS REJECTED WITH HIGH BLOOD PRESSURE. ALSO ONE OR MORE OTHER IMPAIRMENTS

AGES 40-60.  
(M.-A. Table.)

Average Systolic Blood Pressure 167. 10 mm. Hg.

Ages 40-44				Ages 45-49			Ages 50-53		
Year	No.	Exp.	Act.	No.	Exp.	Act.	No.	Exp.	Act.
1907	1	.059	0	7	.492	2	6	.449	4
1908	9	.296	2	18	1.126	2	13	1.151	3
1909	19	.666	6	27	1.274	6	21	1.450	5
1910	9	.259	1	23	.850	5	27	1.622	2
1911	19	.435	2	22	.682	2	30	1.278	3
1912	32	.502	0	35	.749	0	39	1.167	2
1913	31	.276	0	30	.329	2	23	.389	1
1914	32	.102	0	39	.159	0	45	.272	3
1915	26	.029	0	10	.030	0	21	.037	0
Total	178	2.624	11	211	5.691	19	225	7.815	23
Percentage by age	419.20%			333.86%			294.30%		

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TABLE IV.—Continued

Ages 54-56				Ages 57-60			Total			
Year	No.	Exp.	Act.	No.	Exp.	Act.	No.	Exp.	Act.	%
1907	3	.343	1	4	.572	2	21	1.915	9	469.97
1908	10	1.184	2	9	1.209	4	59	4.966	13	267.18
1909	1	1.377	7	24	3.443	4	108	8.210	28	341.04
1910	11	.864	2	30	3.160	6	100	6.755	16	236.86
1911	25	1.415	5	23	1.972	2	119	5.782	14	242.13
1912	20	.765	2	28	1.541	2	154	4.724	6	127.01
1913	25	.565	0	27	.825	2	136	2.384	5	209.73
1914	20	.164	0	33	.369	1	169	1.066	4	375.23
1915	19	.058	0	14	.062	0	90	.216	0	0
Total	150	6.735	19	192	13.153	23	956	36.018	95	263.76
Percentage by age		282.10%			174.86%					

## Impairments Recorded on Application at time of Medical Examinations of the 956 Cases—Ages 40-60.

Arteriosclerosis Atheroma	Heart Murmur	Heart Hypertrophy	Albumin and Sugar	Albumin in Urine	Sugar in Urine	Albumin and Casts	Cast in Urine	Nervous Symptoms	Prostatic Disease	Miscellaneous	Total
139	172	58	19	303	45	21	15	32	18	134	956

TABLE V.

MORTALITY OF REJECTED RISKS WITH HIGH SYSTOLIC BLOOD PRESSURE ONLY.

Ages under 40 (M.-A. Table).  
Average Systolic Blood Pressure 149.50 mm. Hg.

Ages 16-19				Ages 20-24			Ages 25-29		
Year	No.	Exp.	Act.	No.	Exp.	Act.	No.	Exp.	Act.
1911				4	.064		8	.152	
1912	4	.043		29	.325		26	.207	1
1913	2	.013		25	.169		37	.258	
1914	3	.007		26	.066		31	.079	
1915	2	.001		17	.014		24	.021	
Total	11	.064	0	101	.638	0	126	.717	1
Percentage by ages							139.33%		

Ages 30-34				Ages 35-39			Total			
Year	No.	Exp.	Act.	No.	Exp.	Act.	No.	Exp.	Act.	%
1911	5	.090		10	.180	2	27	.486	2	
1912	24	.280	2	42	.559		125	1.414	3	
1913	45	.332		43	.347		152	1.119	0	
1914	25	.071		32	.199		117	.422	0	
1915	17	.015		14	.014		74	.065	0	
Total	116	.788	2	141	1.299	2	495	3.506	5	142.61
Percentage by ages		253.81%		153.96%						



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TABLE V.—*Continued*

Impairments Subsequently Discovered or Developed in the 495 Rejected Cases. Ages under 40.

Arteriosclerosis Atheroma	Heart Murmur	Heart Hypertrophy	Albumin and Sugar	Albumin in Urine	Sugar in Urine	Albumin and Casts	Cast in Urine	Nervous Symptoms	Prostatic Disease	Miscellaneous	Total
3	16	2	2	47	1	16	12	1	0	5	105

TABLE VI.

Impairments Recorded on Applications at time of Medical Examination of the 440 Cases Rejected. Ages under 40. Average Systolic Blood Pressure 150.49 mm. Hg.

Arteriosclerosis Atheroma	Heart Murmur	Heart Hypertrophy	Albumin and Sugar	Albumin in Urine	Sugar in Urine	Albumin and Casts	Cast in Urine	Nervous Symptoms	Prostatic Disease	Miscellaneous	Total
5	178	37	0	112	8	6	1	7	0	86	440

TABLE VII.  
CAUSES OF DEATH.

Causes of Death of the 521 Accepted Risks. Average Blood Pressure of those who died was 153.46 mm. Hg.					Causes of Death of Rejected Risks. Average Blood Pressure of those who died was 172.26 mm. Hg.
	2	Anemia Pernicious	1		
		Aneurism Aorta	1		
	2	Angina Pectoris	3		
	6	Apoplexy	40		
	2	Appendicitis	3		
	4	Arteriosclerosis	19		
	2	Cancer	6		
	1	Cerebrospinal Meningitis			
		Cirrhosis of Liver	3		
		Tuberculosis	1		
		Diabetes	5		
	3	Duodenal Ulcer	2		
	3	Gall Stone	2		
	7	Heart Disease (organic)	35		
	1	La Grippe			
		Locomotor Ataxia	1		
	6	Nephritis	49		
		Paralysis	4		
		Peritonitis	2		
	3	Pneumonia	4		
	1	Prostatic Hypertrophy			
	1	Pyelitis			
	1	R. R. Accident	1		
	2	Rheumatism			
		Stokes-Adams Disease	1		
	2	Suicide	5		
	2	Miscellaneous	3		

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TABLE VIII.

MORTALITY RISKS REJECTED WITH HIGH SYSTOLIC TENSION.

August, 1907, to August 1, 1915—Ages 40-60 inclusive (M.-A. Table).  
Mortality by Ages shown in Tables III. and IV.

Mm. Hg. over the Average for Age	No.	Expected	Actual	%
10-14 mm.	133	2.630	3	114.06
15-24 mm.	615	16.580	30	180.94
25-34 mm.	577	20.922	43	205.52
35-44 mm.	351	15.002	37	246.63
45-59 mm.	328	13.783	35	253.93
60 mm. and over	226	8.444	38	450.02
Total	2230	77.361	186	240.43

TABLE IX.

Age Periods	Total Cases	Average Systolic Pressure by Palpation
15-19	880	120
20-24	3,920	122
25-29	5,892	123
30-34	6,343	124
35-39	7,146	126
40-44	13,849	128
45-49	9,537	130
50-54	5,294	132
55-59	2,379	134
60-64	680	135
65 and over	201	136

Summary of the MORTALITY EXPERIENCE  
of the N.W. MUT. LIFE INS. CO.,  
with respect to SYSTOLIC BLOOD PRESSURE.

PERIOD.	NO. RISKS.		AGES. (INC.)	B.P. Mm. Hg.		OTHER IMPT.	MORTALITY TO AUG 1 <sup>st</sup> 1915.		
	ACCT'D.	REJTD.		RANGE	AV.		100%	200%	300%
Aug. 1 <sup>st</sup> 1907 to Aug. 1 <sup>st</sup> 1910	2630		40-60	140-149	142	—			93.16
	521		40-60	150-160	152½	—			127.00
		302	40-60		170	NONE.			280.41
		288	40-60		171	ONE MORE.			302.16
Aug. 1 <sup>st</sup> 1907 to Aug. 1 <sup>st</sup> 1915		1274	40-60		160	NONE.			220.11
		956	40-60		165	ONE MORE.			263.76
Nov. 1911 Aug. 1915		495	16-39		150	NONE.			142.61
1907-1910 (INC.)	200		40-60	105 & UNDER		—			47.00
	427		40-60	108-110		—			65.00
Nov 1911 to Aug. 1915.	433		16-39	100 & UNDER		—	2 DEATHS.		
	60		40-60			—	NO DEATHS.		

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The conclusions to be drawn from this study, covering a period of eight years, in my opinion are:

- I. That a persistently high arterial tension will result in an excessive mortality, and the higher the arterial tension, the greater the mortality.
- II. That a persistent systolic blood pressure of about 12 mm. above the average for the age would seem to indicate the limit of normal excess variation in man.
- III. That an apparently healthy person may have high arterial tension extending over a considerable period of time without a discoverable impairment to account for same.
- IV. That of the medical impairments found, together with high arterial tension, both below and above the age of 40, more than 75 per cent. are cardiovascular.
- V. That while the normal average blood pressure increases with age so far as investigated (*i. e.*, age 60 or 65), materially higher arterial tension is not necessarily to be expected at older ages.
- VI. That persons with a systolic blood pressure between 90 and 110 mm. show a more favorable mortality than persons with a pressure 12 mm. above the average pressure for the age.
- VII. That in persons whose weight is 20 per cent. or more in excess of the average for height and age, blood pressure averages about 4 mm. higher than those of normal weight.

The following histories are taken from cases recorded in Tables III., IV., and V. Those marked with an (\*) refer to cases whose histories were recorded in the Committee Report of the Twenty-Second annual meeting of the Association of Life Insurance Medical Directors, pages 402, 403, 404.

\*CASE 4. Age 41; proprietor provision and grocery store; examined October 9, 1908; blood pressure 160 mm. Pulse

84. Trace albumin in the urine. Family history—negative. Personal history—multiple neuritis in February 1908, in arms and legs, six weeks in the house. Had headaches frequently before the neuritis, none since. In 1911, advised that he was subject to migraine. Application was rejected in November, 1908. Died in 1913, cause of death, nephritis.

\*CASE 5. Age 53; manager of wire cloth company; examined November 5, 1909; blood pressure 210 mm. Albumin present in urine. Family history—negative. Personal history—neuritis four years prior to examination, for ten weeks. Application rejected November, 1909. In April, 1911, we were advised there was no improvement in his condition. Blood pressure was 200 to 225 mm. Hg. unless under active treatment. Albumin present. Diagnosis interstitial nephritis. Died November 25, 1913, of cerebral apoplexy. Three months after the first stroke blood pressure had been running from 208 to 238 mm. previous to his death.

\*CASE 6. Age 41; bookkeeper; examined December 14, 1908. Blood pressure 156 mm. Further readings December 25, 1908, and January, 1909, 150 mm. to 170 mm. Hg. August, 1911, under the care of an oculist, failing eyesight due to atrophy of optic nerves. Specific trouble suspected although denied by the applicant. In 1915, advised applicant had become totally blind, was examined and considered in good health otherwise.

\*CASE 8. Age 54; insurance secretary; examined December 5, 1908; blood pressure 185 mm. August 11, 1911, had slight attacks of dizziness at times. Family physician advised in 1915, that applicant's blood pressure was running from 180 mm. to 190 mm., and that applicant had attacks of dizziness and felt badly. Not materially benefited by treatment.

\*CASE 10. Age 52; lawyer; examined November 23, 1909; blood pressure 170 mm. Following day 180 mm. and up to 195 mm. The urine contained albumin on first examination and on the following day sugar was present. Family history—negative. Applicant stated that he had headaches about once a month, always had had them but laxative cured them.

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His application was rejected December, 1909. This man died in February, 1911, of nephritis.

\*CASE 13. Age 49; manufacturer; examined October, 1907; blood pressure ranged between 218 and 242 mm. One reading examiner reported later "350"—no other improvement. September, 1908—reported suffering from chronic nephritis. No further reports available. Died February 22, 1914, cerebral embolism.

CASE 15. Age 38; mechanical engineer; examined at this office November 15, 1911; blood pressure 200 mm. Second pulmonic slightly accentuated. Applicant called for further readings. November 23d his blood pressure was 210 mm. Urine negative on both examinations. Applicant called again January 30, 1912. Systolic blood pressure 190 mm., diastolic 150 mm. Urine contained a slight trace of albumin. The following April applicant called at the Home Office again and his blood pressure was 196 mm. There was a distinct ring of albumin in his urine, microscopically a few pus cells and two hyaline casts. Application rejected. Personal and family history were negative. Died September 5, 1915, of angina pectoris and dilatation of heart. (Specific disease suspected.)

CASE 16. Age 34; funeral director and monumental dealer; examined November 19, 1912; blood pressure 140 mm. Two subsequent readings, 140 mm., 145 mm. Urinalysis negative. A specimen examined at this office found normal except a number of hyaline casts. Application was rejected December 13, 1912. Died April 28, 1915, of paretic dementia.

CASE 17. Age 54; cashier lumber company; examined April 26, 1913; blood pressure 170 mm. Two days later 158 mm. Habits in the use of stimulants moderate. Personal history: had heat exhaustion four years prior to his examination, duration three or four days. Examination of applicant's heart, lungs, and kidneys negative. Application was rejected May, 1913. Died in May, 1914, of organic heart disease.

CASE 18. Age 44; iron miner underground; examined March 4, 1913; blood pressure 148 mm., 150 mm. Family

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and personal history—negative. Trace of albumin found in specimen examined at the Home Office, microscopically negative. Was rejected March, 1913. Died in March, 1915, of acute nephritis.

CASE 19. Age 52; shipping clerk, metal binding factory; examined January 30, 1910; systolic blood pressure 200 mm.; diastolic pressure 170 mm. The following February his blood pressure was 180 mm. Applicant had always been a total abstainer. Height 5' 11", weight 190 lbs. Application rejected March, 1910. About one year after the examination applicant had a slight cerebral hemorrhage. Died March, 1914, of nephritis.

CASE 20. Age 45; treasurer of iron and steel company; examined December 19, 1908; blood pressure 165 mm., 1:30 P.M., 170 mm. at 10:00 A.M., December 21, 1908. Applicant had been a total abstainer all his life. Family history—father died at age 67 of apoplexy. Mother died at age 58 of cancer. Mother's mother died at age 80 of apoplexy. Personal history—negative. Application was rejected in December, 1908. We were advised in February, 1913, that applicant died of cerebral apoplexy.

CASE 21. Age 51; boiler manufacturer; examined November 4, 1910; blood pressure 150 mm., 160 mm. Ten days later the blood pressure varied from 142 mm. to 148 mm. Two weeks later three readings were 142 mm. to 150 mm. Urinary examination at the Home Office—albumin and sugar negative—two or three granular and hyaline casts. On December 2, 1910, two specimens of urine examined at the Home Office contained a trace of albumin. December 6, 1910, two additional specimens of urine forwarded the Home Office contained trace of albumin, also hyaline casts. Applicant died May 11, 1913, of nephritis.

CASE 22. Age 58; merchant wholesale hats; examined April 6, 1911; blood pressure 165 mm. with 5" cuff. Albumin in urine. Pulse was full and bounding. Family and personal history—negative. Applicant died September 4, 1915, of nephritis and arteriosclerosis.



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CASE 23. Age 45; examined Home Office December, 1898. Mitral and pulmonic systolic murmur present with slight hypertrophy. Urine normal. Family record satisfactory and personal health record normal. Examined again in September, 1900. No change in condition except cardiac hypertrophy more marked. Again examined at the Home Office in October, 1912. Little or no change in condition of heart. A simple goiter without symptoms had developed. Blood pressure 275 mm.; one week later 255 mm. No albumin or casts. Continued his occupation as bookkeeper without loss of time or inconvenience until January, 1915, at which time he became quite nervous, memory somewhat defective. Consulted a nerve specialist. Blood pressure 255 mm. One week later 195 mm., February, 1915, 250 mm. Off duty three weeks. Returned to work, changed to a position less exacting; slept well, appetite good. Examined Home Office September 13, 1915; blood pressure systolic, 280 mm.—heart hypertrophy increased, heart murmur noted above still present. Albumin in urine also hyaline casts. Continues in his clerical position and expressed himself as feeling fairly well. Probably has had hypertension since 1898.

CASE 24. Age 48; farmer; examined August 26, 1912; blood pressure 150 mm. The following month three readings taken were 148 mm. to 150 mm. Family and personal history—negative. In June, 1915, we were informed that the applicant was feeling pretty well but was unable to do a full day's work. His blood pressure was 220 mm.

CASE 25. Age 48; metal merchant; examined August, 1908; blood pressure 200 mm. Family and personal history—negative. Application declined November, 1908. We were advised in 1911, that applicant's general appearance would indicate good health and that he stated he felt perfectly well. He was not under a physician's care. In June, 1915, his family physician reported that the applicant suffered from a slight cerebral hemorrhage about three years ago; that he is still living but not in good health. His blood pressure was about 140 mm. No albumin.

CASE 26. Age 47; examined November 30, 1912; blood pressure 144 mm. A light systolic murmur at the apex. Height 6' 1", weight 214 lbs. In June, 1915, advised applicant is not in good health; that he has asthmatic attacks and suffers from severe attacks of vertigo. Blood pressure reported to be between 180 mm. and 200 mm.

CASE 27. Age 60; traveling salesman; examined June 26, 1909; blood pressure 175 mm. One month later over 170 mm. Family and personal history—negative. In 1911, reported to be in excellent health. In July, 1915, reported that applicant was ill four months in 1913; diagnosis aphasia due to cerebral hemorrhage—no hemiplegia. Now working.

CASE 28. Age 54; hardware merchant; examined March 21, 1913; blood pressure 180 mm., diastolic 116 mm. Family and personal history negative. Height 5' 8", weight 213 pounds. A week following his examination applicant called for blood pressure readings. Blood pressure 150 mm. to 160 mm., by palpation and 162 mm. to 164 mm. by auscultation, diastolic 104 mm. by auscultation. Urinary examination negative chemically, microscopically three hyaline casts. Applicant called for further observation September 29, 1915. His blood pressure was 192 mm., diastolic 112 mm., by auscultatory method. Trace of albumin. Weight, 197 pounds.

CASE 29. Age 58; department manager wholesale dry-goods establishment; examined November 11, 1909; blood pressure 165 mm. Applicant called for further readings one week later and the blood pressure was 202 mm. Family and personal history negative. Application declined November, 1909. Were advised by applicant's family physician in 1911, that applicant was in good health, played golf a good deal, but consulted him frequently for headaches due to autointoxication. Advised applicant had hemorrhage of the brain in January, 1914, and a second hemorrhage in August, 1914; that he has a persistently high blood pressure of 160 mm. to 180 mm. and higher at times. Applicant was at home but able to go about. The doctor stated applicant had not gone to business since his first attack and the outlook was not good.

Dr. Porter—We are certainly indebted to Dr. Fisher not only for this contribution but for his contributions in years past which have been of inestimable value in our work. The question of diastolic pressure has not been dealt with at large, in fact it has been hardly mentioned in passing, and we are fortunate in having with us this afternoon a new member, Dr. Lewis F. MacKenzie, who has kindly prepared a paper on the subject with especial reference to the diastolic pressure. I call upon Dr. MacKenzie to respond to that subject.

Dr. Lewis F. MacKenzie then read the following paper, entitled:

BLOOD PRESSURE WITH A SPECIAL REFERENCE  
TO THE DIASTOLIC.

BY LEWIS F. MACKENZIE, M.D.,

*Assistant Medical Director, Prudential Insurance Company  
of America, Newark, N. J.*

Blood pressure from the systolic standpoint has been so thoroughly investigated and its normal averages at the different ages so well established, that owing to the brief time at my disposal, little attention will be paid to it.

An analysis of 18,637 records from our approved male cases during the years 1912 to 1914, inclusive, gives the systolic pressures by quinquennial periods, as shown in Table I.

TABLE I.

Age Periods	Cases	Mm. Hg.	Average Systolic Pressure
15-19	187	22,316	119
20-24	1,690	205,695	122
25-29	3,351	412,908	123
30-34	4,011	498,924	124
35-39	3,934	494,350	126
40-44	2,883	367,343	127
45-49	1,550	199,992	129
50-54	677	89,254	132
55-59	257	34,697	135
60-64	76	10,411	137
65-66	21	2,917	139
All Ages	18,637	2,338,807	125

The large number of cases involved and the close agreement between these pressures and those of the Northwestern Mutual and the Mutual Benefit as reported by Dr. Fisher (1) and Dr. Van Wagenen (2) makes the correctness of the pressures at the various ages seem very certain as they practically represent a total of 36,104 cases. At no age group is there a variation of more than 3 mm. among the different records.

The limits within which this pressure may vary, under normal conditions, seem to be almost as thoroughly established (Table II.) for 9,370 records in 1912 and 1913, and 9,268 in 1914, each gave a variation for all ages of 15 mm. Hg. above and 15 mm. Hg. below the average. It will be noticed that the range is a trifle smaller at the younger ages.

TABLE II.

## NORMAL SYSTOLIC RANGE.

Ages	No. of Cases (1912-13)	Range	No. of Cases (1914)	Range
15-39	6,416	28	6,758	28
40-66	2,954	30	2,510	30
15-66	9,370	30	9,268	30

## SELECTED EXAMINERS.

Ages	No. of Cases (1914)	Range
15-39	1,043	28
40-66	415	36
15-66	1,458	30

Dr. Fisher (3) evidently agrees with 15 mm. above as he states that, "We take our average for the age and where the blood pressure is 15 mm. in excess of that average we call that a high blood pressure, and we call for additional tests." It seems quite as reasonable to suppose that 15 mm. below is equally as accurate. This is also demonstrated by Table II. and attention is called to the fact that the range in the two groups, 1912-13 and 1914 was exactly the same.

We wish to emphasize the fact that from ages 15 to 66 there is a gradual increase in the average systolic pressure and the limits within which it may be considered normal, as shown by Table III., at no point, even in the young ages, fall below 104 mm. or at the older ages rise above 150 mm. It is felt, however, that a pressure somewhat below the low limits is not usually as serious an impairment as one equally above the high limits.

TABLE III.  
NORMAL LIMITS OF SYSTOLIC PRESSURE.

Ages	Low -15 mm.	Average Mm. Hg.	High +15 mm.
15-19	104	119	134
20-24	107	122	137
25-29	108	123	138
30-34	109	124	139
35-39	111	126	141
40-44	112	127	142
45-49	114	129	144
50-54	117	132	147
55-59	120	135	150
60-64	122	137	152
65-66	124	139	154

An attempt has been made to determine the effect of pulse rate on systolic pressure—Table IV. indicates, where there are enough cases to be of any value, that for each increase of five pulse beats, the pressure rises 1 mm.

TABLE IV.  
SYSTOLIC PRESSURE BY PULSE RATE IN NORMAL WEIGHTS.

ALL AGES		
Pulse Rate	Cases	Systolic Pressure
50-54	9	124
55-59	18	117
60-64	202	122
65-69	591	124
70-74	3,783	124
75-79	2,293	125
80-84	1,184	126
85-90	224	127
50-90	8,304	125

Table V. shows where there are enough cases to be of any value that there is a slight rise in pressure in the overweights; the underweights give no indication as to the effect on pressure owing to the small number of cases.

TABLE V.  
SYSTOLIC PRESSURE BY WEIGHT.

Weight	Cases	Mm. Hg.	Pressure
30% and under	8	1,030	129
20-29% and under	312	38,931	125
Normal	16,738	2,095,921	125
20-29% and over	1,225	157,280	128
30-39% and over	313	40,472	129
40% and over	41	5,173	126
Total	18,637	2,338,807	125

In Table VI. the effect of height is shown. As the difference between those 5 ft. 6 in. and under and those 5 ft. 7 in. and over is but 1 mm. the effect of height is practically nil.

TABLE VI.  
SYSTOLIC PRESSURE BY HEIGHT.

Height	Cases	Mm. Hg.	Pressure
5 ft. 2 in. and under	171	21,420	125
5 ft. 3 in. to 5 ft. 6 in.	3,718	464,454	125
5 ft. 7 in. to 5 ft. 10 in.	10,858	1,362,787	126
5 ft. 11 in. and over	3,890	490,146	126
Total	18,637	2,338,807	125

#### DIASTOLIC PRESSURE.

In 1876, Marey devised an instrument for measuring the diastolic pressure and propounded the theory that the maximal

oscillation occurred when the external pressure exactly equalled the intra-arterial and this maximal oscillation corresponded to the diastolic pressure. In 1897, Hill and Barnard invented a spring instrument for the measurement of this pressure. As the methods for reading these pressures were dependent on maximal oscillation and palpation, the results were not satisfactory.

It was not until 1905 that it was possible to take the diastolic pressure, for clinical purposes, with any degree of accuracy. In this year Korotkow announced the auscultatory method. Since then more attention has been paid to this pressure, but it is only within the last three years that it has received anything like general consideration.

The point at which to take this pressure has caused much discussion. Korotkow (4) said it should be taken at the "end tone" or beginning of the fourth phase, while Ettinger (4) believed it occurred at the beginning of the fifth phase or disappearance of all sound. Erlanger (4), in 1910, after considerable experimental work, stated it should be read at the point where the maximal oscillation became smaller, and Warfield (4), after a series of experiments, believed it occurred at the change from the clear to the dull tone or beginning of the fourth phase. Hooker and Southworth (5), on the other hand, agree with Ettinger, that it should be read at the fifth phase. Most observers now support Korotkow, in his original contention. For practical purposes, in the vast majority of cases, the difference between these two phases is so small as to be of no material significance as there is a difference between them, in normal cases, of from but 2 to 8 mm. In young subjects the difference is apt to be greater than in those advanced in age.

In spite of the fact that diastolic pressure has been so long neglected and is at the present time but slightly considered by many able clinicians, it is felt by the writer that this is the fundamental pressure upon which to base our interpretation of blood pressure readings and for the following reasons:

1. Systolic pressure is the expression in mm. Hg. of the



intraventricular pressure and is subject to wide variations from physiologic causes. That its variations may be great and indicate hypertension when such does not exist has been frequently demonstrated in our office.

2. Being intermittent it is less liable to produce pathologic changes in the heart and arteries than is the constantly high diastolic pressure, although if long continued it, of course, has a very marked effect.

3. The diastolic pressure or peripheral resistance, is much less influenced by emotion, etc., and therefore a more accurate guide where but one or two readings are obtainable.

4. It is constant and consequently more effective in causing changes, especially in the arteries.

5. It is the constant resistance which the heart has to overcome before it can drive the blood forward, and is therefore, the fundamental pressure as it represents:

A—The constant pressure to which the arteries are subjected.

B—The pressure which the heart has first of all to overcome.

C—The constant strain which has to be borne by the aorta and aortic valves.

It is evident, therefore, that without knowledge of this pressure it is impossible to estimate the pulse pressure, or understand the real significance of the systolic.

#### PULSE PRESSURE.

The pulse pressure is the expression in mm. Hg. of the head pressure or force of the heart after the diastolic pressure has been overcome. It may be entirely normal while the diastolic and systolic pressures indicate severe circulatory disturbance. It is useful only in showing whether or not the circulation is being properly maintained. The limits of this pressure have been variously estimated, as shown below:

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Hirschfelder	30-45
Faught	25-40
Nicholson	25-40
Janeway	25-40
Erlanger	30-40
Barach & Marks	20-70
Warfield	30-50
Jackson	25-40

Warfield (6) says: "The diastolic has been estimated to be about 45-48 mm. Hg. lower than the systolic, and consequently these figures represent the pulse pressure."

Weyssse and Lutz (7) state the average pulse pressure is 35 mm.

Barach and Marks (8) have given figures which appear to be in excess of the normal range and it is felt that any pulse pressure below 25 or above 60 mm. should call for further investigation, provided we are certain as to the competency of our examiner to take the reading.

Melvin and Murray (9) regard the normal readings for the various pressures in young subjects as follows:

Systolic	Diastolic	Pulse Pressure
111.8	65.7	46

and give the range of the pulse pressure as 22-73 and of the diastolic pressure as 50-82.

Returning to the diastolic, the quotations below serve to justify the opinion previously expressed that it is the most important pressure with which we have to deal in our work.

Weyssse and Lutz (7) state: "The minimum (diastolic) blood pressure is very uniform throughout the day and is little affected by the ingestion and digestion of meals . . . the average minimum blood pressure for healthy young men in the neighborhood of 20 years of age is 85 mm. Hg."

MacWilliam and Melvin (10) state: "The importance of estimating the minimal or diastolic pressure is now becoming more generally recognized and with the easy applicability of

the auditory method there is no difficulty in the way of its routine use."

"As long as the diastolic pressure remains low even with very high systolic readings, the tendency to the giving way of the vessels (cerebral hemorrhage, etc.) seems to be relatively slight."

P. Ballard (11): states "In estimating the blood pressure, the minimal pressure is much more instructive than the maximal, as Pachon reported in 1913, urging that the minimal arterial pressure be accepted as the standard for comparison."

"The maximal pressure may vary within a wide range, but the minimal pressure of 5 cm. Hg. or 50 mm. seems to be the lowest at which the blood is able to keep circulating."

Martin (12): "The diastolic pressure appears to be more stable than the systolic and has less often shown any deviation from the normal without pathological cause. The systolic appears to accommodate itself to the diastolic more readily than the latter to the former."

Janeway (13): "I should like to lay stress on the importance of the simultaneous measurement of systolic and diastolic pressure in determining normal conditions. (The difference between the two is ordinarily 25 to 40 mm., in my experience the lower figures being more common in women—in old men, 50 mm. may be found.)"

" . . . A pulse which shows less than 20 mm. difference between systole and diastole, I think is abnormally small and over 50 mm. similarly large."

Nicholson (14) says: "Second, the importance of routinely taking the diastolic pressure as well as the systolic, as the pulse pressure . . . is often invaluable in determining the amount of arteriosclerosis present."

Nicholson (15): "I wish to emphasize the fact that blood pressure observations should not consist of systolic pressure alone, such readings tell less than half the true situation. It is essential to determine the diastolic pressure. . . . The whole significance of the blood pressure depends on the taking of systolic, diastolic, and pulse pressures."

Barach and Marks (8) make the following comment: "As time goes on and our observations accumulate and are being interpreted, we believe that more importance will be attached to the height of the minimal pressure (diastolic) and that the height of the maximal (systolic) pressure will be considered of lesser clinical importance than heretofore. Certainly the maximal (systolic) pressure alone is of no value except as a starting point for a guess as to the activity of the circulatory system."

Warfield (16) says: "Moreover, the conviction is growing that it is the height of diastolic (minimal) pressure rather than that of the systolic pressure that is really the vital point in blood pressure determination."

Halls Dally (17) says: "Hence, the maximal and minimal pressures between which arterial pressure normally varies are the important criteria which in every case we must definitely determine. . . . To record the maximal pressure, while despising the minimum, not only affords no indication of what the mean pressure is likely to be, but resembles attempting to solve a complicated problem of which one factor only is given. . . . Now that we are in a position to institute a comparison between the maximal and minimal pressures it will probably be found that of the two the diastolic is the more important."

The above quotations clearly indicate the recognition that is now being given to the importance of the diastolic pressure. The fact is, the systolic by itself gives very imperfect information. A high systolic pressure may exist for several weeks as a result of some temporary condition which would disturb the diastolic to a much less extent, or it may be normal with serious disease and therefore taken by itself be misleading.

There is no desire to minimize the value of the systolic pressure, for when continuously high it is always a warning. That this is true has been shown most clearly by Dr. Fisher (1), and each addition made to his original report demonstrates this fact more and more.

To establish the normal diastolic pressure with its normal

variations and range is far from being easy, as there are few statistics covering these points.

Barach and Marks (8): after a very interesting series of observations on young adults, arrived at the following conclusions:

The maximal blood pressure, systolic, is under 150 mm.

Diastolic was found to be as follows:

In 96% of a series of 338 cases at the fifth phase it did not exceed 100 mm.

In 87% of a series of 312 cases at the fourth phase it did not exceed 100 mm., and re-examination of the remaining 13% of the 312 cases showed a minimal pressure not over 100 mm.

In 96% of the total 650 cases the diastolic did not exceed 100 mm., at the first examination.

Nicholson says (15): "The diastolic pressure is between 60 and 105 in healthy individuals." . . . "Even if the systolic pressure were below 150 mm. Hg. a diastolic pressure above 105 mm. Hg. would be a sure indication of hypertension, regardless of the age of the patient."

Norris (18) says: "The diastolic pressure, constantly above 100 mm. Hg. is definitely pathological at any age. The height of the diastolic pressure is often more important than that of the systolic tension. . . . A constant diastolic pressure of or above 100 mm. indicates hypertension regardless of whether the systolic pressure be 180 or 140 mm."

Again: "Given a patient with a well-marked hypertension, 190 mm. systolic, 110 diastolic, we are *de facto* warranted in assuming that the patient is suffering from Bright's disease, at least until further investigation has shown that the hypertension is due to some other cause."

Stone (19): "Since the diastolic pressure measures the peripheral resistance it is a better index of hypertension than the systolic pressure. A sustained diastolic pressure of from 100 to 110 signifies hypertension. The diastolic is less influenced by physiologic factors than the systolic pressure."

As before said, there are few statistics indicating the high and low limits for diastolic pressures. In reviewing the litera-

ture, however, one is impressed with the fact that the diastolic rarely exceeds 100 mm. Hg. unless there is some pathological condition which will account for it.

An analysis of our cards with diastolic records has been made by separate years, to show the changes in pressure in both the diastolic and pulse pressures, as the examiners became more expert. In order to increase the number of cases we had 1103 available cards for 1915 partially analyzed, making a total of 5018 diastolic records.

TABLE VII

Ages	1912-13, 1216 CASES				1914, 2699 CASES			
	Cases	Systolic	Diastolic	Pulse Pressure	Cases	Systolic	Diastolic	Pulse Pressure
15-19	16	120	85	35	24	122	85	37
20-24	89	123	88	35	222	122	87	35
25-29	235	124	92	32	491	123	87	36
30-34	249	125	92	33	652	125	89	36
35-39	244	128	95	33	561	126	90	36
15-39	833	125	92	33	1,950	125	89	36
40-44	188	128	95	33	402	129	92	37
45-49	113	130	99	31	221	129	91	38
50-54	52	131	96	35	86	133	94	39
55-59	21	139	108	31	34	137	100	37
60-64	8	137	108	29	4	141	101	40
65-66	1	140	110	30	2	149	99	50
40-66	383	130	98	32	749	130	93	36
15-66	1,216	127	94	33	2,699	126	90	36

It will be noted in Table VII. that the 1914 figures for diastolic pressure are below those of 1912 and 1913, while the pulse pressure has increased—further, there is a rise in diastolic pressure with age similar to that of the systolic, but the pulse pressure remains practically constant during all ages. This is further demonstrated by Table VIII., which is a condensed analysis and includes the 1915 cases.

TABLE VIII.

COMBINED DIASTOLIC AND BLOOD PRESSURES.

Year	Total Cases	Total Systolic	Total Diastolic	Average Systolic	Average Diastolic	Average Pulse Pressure
AGES 15-39						
1912-13	833	103,997 mm.	76,697 mm.	125 mm.	92 mm.	33 mm.
1914	1,950	242,885 "	172,658 "	125 "	89 "	36 "
1915	786	98,274 "	69,268 "	125 "	88 "	37 "
Total	3,569	445,156 "	318,623 "	125 "	89 "	36 "
AGES 40-66						
1912-13	383	49,829 mm.	37,340 mm.	130 mm.	98 mm.	32 mm.
1914	749	97,151 "	69,378 "	130 "	93 "	37 "
1915	317	41,011 "	28,807 "	129 "	91 "	38 "
Total	1,449	187,991 "	135,521 "	130 "	93 "	37 "
ALL YEARS						
Ages						
15-39	3,569	445,156 mm.	318,623 mm.	125 mm.	89 mm.	36 mm.
40-66	1,449	187,991 "	135,521 "	130 "	93 "	37 "
15-66	5,018	633,147 "	454,144 "	126 "	91 "	35 "

An examination of the 1915 records in this table shows a further reduction in the diastolic readings and an increase in the pulse pressure, over the preceding years. It is believed that as the examiners become more familiar with taking the diastolic pressure and our records increase in volume, that there will be a further reduction in the diastolic figures with an increase in the pulse pressure over that now shown.

An attempt has been made to determine the range of diastolic pressure as shown in Table IX.

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TABLE IX.

## DIASTOLIC RANGE.

Ages	Cases	Average High	Average	Average Low	Total Range
1912-1913					
15-39	833	104 mm.	92 mm.	83 mm.	42 mm.
40-66	383	111 "	98 "	86 "	50 "
15-66	1,216	106 "	94 "	84 "	44 "
1914					
15-39	1,950	97 mm.	89 mm.	78 mm.	38 mm.
40-66	747	103 "	93 "	83 "	40 "
15-66	2,697	101 "	90 "	79 "	44 "
SELECTED EXAMINERS, CASES YEAR 1914					
15-39	1,043	96 mm.	87 mm.	78 mm.	36 mm.
40-66	415	101 "	91 "	83 "	36 "
15-66	1,458	97 "	89 "	79 "	36 "

In order to ascertain as nearly as possible, the normal diastolic range we took records from reports completed by some examiners in whose ability to give us proper readings we had every confidence, and 1458 such records were used giving for all ages a constant range of 36 mm. This is lower than the figures from all the records, but it is felt that these are still too high; that the diastolic range should be greater than the systolic seems hardly possible, as this pressure is more constant and less influenced by emotion, etc. The total range given in this table, it will be noted, is twice the range between the high and low averages.

From our figures the diastolic range is then 18 mm. above and 18 mm. below the normal average for any given age.



TABLE X.  
NORMAL DIASTOLIC LIMITS.

Ages	Minimum —18 mm.	Average Year 1914	Maximum +18 mm.
15-19	67	85	103
20-24	69	87	105
25-29	69	87	105
30-34	71	89	107
35-39	72	90	108
40-44	74	92	110
45-49	73	91	109
50-54	76	94	112
55-59	82	100	118
60-64	83	101	119
65-69	81	99	117

Using this range Table X. was prepared in an endeavor to show the minimum and maximum limits within which this pressure may be considered normal. It is believed that the limits as given here are excessive and for this reason Table XI. was constructed considering from 25-60 mm., the normal pulse pressure and using the average systolic pressures as a basis.

TABLE XI.  
NORMAL DIASTOLIC LIMITS BY PULSE PRESSURE.

Ages	Average Systolic	Minimum Diastolic —60 mm.	Maximum Diastolic —25 mm.
15-19	119	59	94
20-24	122	62	97
25-29	123	63	98
30-34	124	64	99
35-39	125	65	100
40-44	127	67	102
45-49	129	69	104
50-54	132	72	107
55-59	135	75	109
60-64	137	77	112

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These limits are within those given in Table X. and are probably nearer the truth. It is evident from Table XI. that a maximum diastolic pressure over 100 mm. under age 40 or over 110 mm. above that age must be looked upon as abnormal. This agrees with quotations previously made.

TABLE XII.  
PULSE PRESSURE.

Ages	1912-13	1914	1915
15-39	33 mm. Hg.	36 mm. Hg.	37 mm. Hg.
40-66	32 " "	37 " "	38 " "
15-66	33 " "	36 " "	37 " "

Table XII. shows the average pulse pressure for the different years and indicates that it is slightly larger over age 40 than under; also that with greater accuracy on the part of the examiners it is increasing.

In concluding this paper I wish to quote from a recent article by MacWilliam and Melvin (20), dealing with the diastolic blood pressure:

"The estimation of diastolic pressure by the auscultatory method is a process which takes very little time and trouble and yields very definite and valuable information. The procedure is one calculated to produce less circulatory disturbance in abnormally sensitive cases than the stronger (obliterative) constriction of the comparatively large vascular area involved in systolic determination."

"Moreover, diastolic estimation is much less, if to any comparative extent, at all, affected by the main sources of fallacy in systolic estimation . . . variation in the resistance of the arterial wall, possibility of reflected waves, etc."

"Even comparatively slight changes in diastolic pressures, unless dependent on alterations in the pulse rate, are of con-

siderable significance as indications of circulatory conditions (changes in peripheral resistance, etc.)."

"Diastolic pressure estimation by the auditory method is not only as simple in application as the systolic estimation, but is comparatively little, if at all, influenced by many of the complications as regards local conditions, etc., which may in some cases introduce serious fallacy into systolic estimations; it also causes less disturbance (circulatory, etc.), in very sensitive subjects, much less constriction of the limb being needed."

"Changes in diastolic pressure, of relatively small amount, unless dependent on an altered pulse rate, are of much significance as indications of circulatory conditions."

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Dr. Porter—I want to thank Dr. MacKenzie for this contribution. It opens up a new field for discussion, that is, new to our Association, as we have not gone into it in detail in the past; and I would ask the members who carry on the discussion to take under consideration this phase of the question and embody it in their discussion.

In response to my circular letter to members asking that they participate in the discussions at our meeting, I received most cordial support from one of our members who immediately became interested and to my delight he presented to me, some time before the meeting, not only a prepared discussion but a very able paper upon a phase of this question which is somewhat foreign to the direct object of the original paper and the report of the Committee, yet it is one of very great value and particularly so to those writing substandard business. I refer to Dr. Paul E. Tiemann who will present his admirable paper in the form of a discussion.

Dr. Tiemann—Mr. President and Gentlemen: My little contribution to-day is the result of curiosity on the subject of diastolic pressure in heart murmurs, and if it should be more than a curiosity I shall certainly feel very gratified.

ARTERIAL TENSION IN CONNECTION WITH  
CARDIAC MURMURS.

*(Based on Personal Observations Made at the Home Office of  
the New York Life Insurance Company.)*

BY PAUL E. TIEMANN, M.D., *Medical Supervisor.*

Applicants for life insurance often present themselves for examination quite unaware of any cardiac abnormality, and again they may state that they have had a murmur for years but have never experienced any symptoms whatever. In fact in the great majority of cases where there is an unmistakable lesion it is evident that compensation is well maintained. Therefore the following observations must be considered with special reference to life insurance examinations.

In many instances diagnosis is difficult; thus we find a large class of cases in which the murmur is the only evidence of cardiac lesion, so-called "functional" murmurs. Another large class is characterized by a systolic murmur at the base, which does not fall in the category of functional murmurs because of the intensity or distribution of the murmur, the force or the displacement of the apex beat, and so on, and in this article these murmurs are placed in the group, "Aortic Obstruction," though it is not claimed by any means that they are all cases of true Aortic Stenosis. Indeed Hirschfelder states that Aortic Stenosis is the least frequent of the lesions of the left side of the heart—5% of 1781 cases of cardiac disease at Johns Hopkins.

In this report the attempt has been made to consider only uncomplicated cases of cardiac murmur. Other conditions which might have exerted an independent influence on the blood pressure have been excluded, such as albuminuria with or without casts, glycosuria or a recent history of the same, pulmonary lesions, marked anemia, and so forth. Exceptions are three cases in the Aortic Regurgitation group, one with a

few hyaline casts, and two where the analysis of the urine was not known.

The blood pressure was taken by the auscultatory method, the fourth phase being selected to determine the diastolic pressure. The instruments were the Tycos and the mercury manometer, the former being checked up with the latter from time to time to make sure that the two agreed.

F. A. Faught believes that in the pulse pressure there is a definite guide to the state of the cardio-vascular system which is more reliable than the systolic pressure alone. He claims that the normal relation between systolic, diastolic and pulse pressures should be,  $D = \frac{2}{3} S$ .  $P = \frac{1}{2} D$ , or a ratio of 1-2-3, and that if this ratio be maintained the resulting arterial compensation may be regarded as safe. Reference will be made later to this pressure ratio. From observations on twenty normal cases, from 22 to 53 years of age, Faught found the tensions as follows:

	Systolic	Diastolic	Pulse
High.....	155	100	55
Low.....	110	70	35
Average.....	125	85	43

This works out very closely on applying the 1-2-3 ratio to the average tension. Two-thirds of 125 = 83, and one-half of 85 = 42.

#### FUNCTIONAL MURMURS.

There were seventeen cases between the ages of 19 and 41. The average blood tension of these was:

	Systolic	Diastolic	Pulse
By Faught's 1-2-3 ratio	126	76	50
or a practically normal tension	126	84	42

## MITRAL REGURGITATION.

In compensated Mitral Regurgitation the arterial tension is practically normal, according to Norris. Hirschfelder says the tension exhibits no characteristic features, and the figures obtained are the results of varying causes. At Johns Hopkins Hirschfelder found that 29% of the cases of Mitral Regurgitation were associated with Aortic Regurgitation, 21% with Mitral Obstruction. In this connection it may be pointed out that a high pulse pressure in Mitral Regurgitation may be indicative of beginning Aortic Regurgitation.

## TENSION IN 68 CASES OF SIMPLE M. R.

	Ages	Below 20	20 to 30	30 to 40	40 to 50	50 to 60	60 to 70	70 —
		3 Cases	30 Cases	19 Cases	8 Cases	6 Cases	1 Case	1 Case
<i>Systolic, High</i>		150	175	165	185	180		
	<i>Low</i>	130	100	110	120	120		
	<i>Average</i>	140	137	135	139	147	165	145
<i>Diastolic, High</i>		80	100	105	105	105		
	<i>Low</i>	60	55	55	70	80		
	<i>Average</i>	70	75	81	82	89	100	75
<i>Pulse, High</i>		90	95	70	80	75		
	<i>Low</i>	50	20	35	45	50		
	<i>Average</i>	70	61	54	57	57	65	70

	S.	D.	P.
<i>Average tension for all ages,</i>	144	82	62
<i>According to 1-2-3 ratio,</i>	144	96	48
Showing an increased pulse pressure.			
These figures are appreciably higher than Faught's average of	125	85	43

## AORTIC OBSTRUCTION.

In pure Aortic Obstruction both the systolic and the diastolic pressures are slightly increased, partly due to the hypertrophy of the left ventricle, partly due to the general arterial sclerosis. The pulse pressure is small. (Norris.)

In Aortic Obstruction Hirschfelder says that tension is slightly elevated, a maximum of 130 to 160 systolic, partly due to the accompanying arterio-sclerosis, partly to the increased intra-ventricular pressure.

Bearing in mind what was said in the beginning about the class of cases enumerated under the head of Aortic Obstruction, the following table of pressures is submitted:

TENSION IN 50 CASES OF AORTIC OBSTRUCTION.

	Ages	Below 20	20 to 30	30 to 40	40 to 50	50 to 60
		5 Cases	22 Cases	10 Cases	8 Cases	5 Cases
<i>Systolic, High</i>		130	160	150	180	160
	<i>Low</i>	110	105	115	120	115
	<i>Average</i>	123	135	136	146	136
<i>Diastolic, High</i>		85	100	90	100	95
	<i>Low</i>	50	60	60	75	75
	<i>Average</i>	69	76	79	87	84
<i>Pulse, High</i>		65	95	80	80	65
	<i>Low</i>	40	35	35	40	25
	<i>Average</i>	54	58	57	59	44

	S	D	P
Average for all ages	135	79	54
Not far from the 1-2-3 ratio of	135	90	45
Or from Faught's normal average of	125	85	43



## AORTIC REGURGITATION.

Aortic Regurgitation is characterized by a greatly reduced diastolic pressure, at times only 30 to 40, where the normal is 90 to 100. Schwarzman says he is greatly impressed with this phenomenon, and when he finds such a low diastolic pressure he makes the diagnosis of Aortic Regurgitation even when no murmur exists, and the subsequent course of the case justifies this view.

According to Norris, in Aortic Regurgitation a high pressure is often seen with good compensation; thus, a systolic pressure of 180 to 200 should not be regarded as hypertension. In estimating the diastolic pressure the fourth phase, or muffled sound, must be chosen, since the fifth phase sometimes persists down to the zero of the scale.

In Aortic Regurgitation Hirschfelder describes two groups of cases, one the endo-carditic, where there is a considerable fall in the minimum pressure, as for example, S. 150, D. 50, and second, the arterio-sclerotic, where there is a considerable rise in the maximum pressure, as, S. 170, D. 90.

The distinguishing feature of Aortic Regurgitation, therefore, is the constant high pulse pressure. Where the murmur is present but the pressure is near the normal it is probable that the leak in the valve is small.

Norris says Aortic Regurgitation may exist without an audible murmur, or the murmur may be low-pitched and difficult to hear. Thus, Jackson in 100 autopsies found that this was the most frequently overlooked of the valvular lesions.

The following table comprises cases of simple Aortic Regurgitation and of Aortic Regurgitation with other valvular lesions. The tension of each individual case is first given.

TENSION IN 29 CASES OF SIMPLE AND MIXED  
AORTIC REGURGITATION.

Below 20	20 to 30	30 to 40	40 to 50	50 to 60
S D P	S D P	S D P	S D P	S D P
<sup>1</sup> 145 55 90	<sup>1</sup> 130 30 100	<sup>1</sup> 140 50 90	<sup>5</sup> 175 70 105	<sup>1</sup> 145 85 60
	<sup>1</sup> 135 40 95	<sup>1</sup> 140 50 90		
	<sup>1</sup> 125 70 55	<sup>1</sup> 155 55 100		
	<sup>1</sup> 110 55 55	<sup>1</sup> 185 120 65		
	<sup>1</sup> 140 50 90	<sup>2</sup> 125 55 70		
	<sup>1</sup> 145 85 60	<sup>2</sup> 195 85 110		
	<sup>1</sup> 150 75 75	<sup>4</sup> 185 100 85		
	<sup>1</sup> 125 25 100	<sup>5</sup> 165 55 110		
	<sup>2</sup> 145 40 105	<sup>5</sup> 140 80 60		
	<sup>3</sup> 120 75 45			
	<sup>5</sup> 145 70 75			
	<sup>5</sup> 155 70 85			
	<sup>5</sup> 130 50 80			
	<sup>5</sup> 200 70 130			
	<sup>5</sup> 140 70 70			
	<sup>5</sup> 150 60 90			
	<sup>5</sup> 150 65 85			

<sup>1</sup> = Simple A. R.<sup>2</sup> = A. R., A. O., M. R.<sup>3</sup> = A. R., M. R.<sup>4</sup> = A. R., M. R., a few hyaline casts.<sup>5</sup> = A. R., A. O.<sup>6</sup> = A. R., A. O., urine unknown.

TENSION IN AORTIC REGURGITATION (*continued*).

		SIMPLE AND COMPLICATED					SIMPLE				
		Ages									
		Below 20 1 case	20 to 30 17 cases	30 to 40 9 cases	40 to 50 1 case	50 to 60 1 case	Below 20 1 case	20 to 30 8 cases	30 to 40 4 cases	50 to 60 1 case	
<i>Systolic,</i>	<i>High</i>		200	195				150	185		
	<i>Low</i>		110	125				110	140		
	<i>Average</i>	145	140	158	175	145	145	132	155	145	
<i>Diastolic,</i>	<i>High</i>		85	120				85	120		
	<i>Low</i>		25	50				25	50		
	<i>Average</i>	55	59	72	70	85	55	54	69	85	
<i>Pulse,</i>	<i>High</i>		130	110				100	100		
	<i>Low</i>		45	60				55	65		
	<i>Average</i>	90	82	86	60	60	90	79	86	60	

NOTE. A case of A. R. and M. R. showed:

S. 170 D. 30 P. 140.

Urine showed trace albumin, no casts.

Applicant aged 21, apparently in good health.

The fifth phase continued distinctly to zero of the dial.

	S	D	P
Average tension, Mixed A. R.	152	68	75
Tension according to 1-2-3 ratio	152	101	50
Average tension, Faught's normal series	125	85	43

## MITRAL OBSTRUCTION.

In compensated Mitral Obstruction the tension is more frequently above than below the normal; the pulse pressure is small. (Norris.)

Faught says the blood tension may be low because only a portion of the normal amount of blood can be forced into the left ventricle.

Only eight cases were observed, but the figures are presented as they may be of interest:

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## TENSION IN EIGHT CASES OF MITRAL OBSTRUCTION.

Ages	20 to 30 3 cases			30 to 40 5 cases		
	S	D	P	S	D	P
<sup>1</sup> 125	60	65		125	75	50
125	80	45		110	85	25
<sup>2</sup> 135	80	55		130	95	35
				110	75	35
				145	80	65

<sup>1</sup> = M. O., M. R.

<sup>2</sup> = M. O., A. R.

## AVERAGE TENSION EIGHT CASES OF MITRAL OBSTRUCTION.

Systolic		Diastolic		Pulse	
High	140	High	87	High	65
Low	117	Low	67	Low	35
Average	126	Average	77	Average	48
		S	D	P	
Average M. O.		126	77	48	
1-2-3 ratio		126	84	42	
Faught's average		125	85	43	

## REFERENCES.

- HIRSCHFELDER. *Diseases of the Heart and Aorta*, 1913.  
 F. A. FAUGHT. *N. Y. Medical Journal*, Feb. 27, 1915. "Relationship and Value of the Systolic, Diastolic and Pulse Pressures."  
 NORRIS. *Blood Pressure, Its Clinical Applications*, 1914.  
 SCHWARZMAN. *N. Y. Medical Journal*, September 5, 1914.  
 F. A. FAUGHT. *Blood Tension in Diseases of the Heart*.

Dr. Wells (Chairman *pro tem.*)—I will now ask Dr. Rockwell to continue the discussion.

Dr. Rockwell—Mr. Chairman: I certainly have enjoyed listening to our good friend, Dr. Fisher, who told us what we

all need to know about systolic pressure, and Dr. MacKenzie and Dr. Tiemann have entered upon what seems to me if not an entirely new subject a very opportune one, and I predict that we will pay a great deal more attention to diastolic pressure in the future than we have in the past. When Dr. Porter requested me to discuss the papers on blood pressure that we have had to-day, I accepted with some hesitation because the subject seems to have been so thoroughly and carefully covered by competent observers and it would seem there remains little to be said. As a preface to my remarks, I would say that at the present time our company is getting routine blood pressures in between 75% and 80% of all of our cases. I think that is rather a favorable showing considering how extensively we operate, how many places we go to get our business. About a year ago I was struck with the fact that while we had a great many statistics accumulated on the blood pressures taken from Maine to California, and particularly on the diastolic pressures, yet there did not seem to be a logical difference in many instances in the diastolic and systolic pressures as given by our examiners. Therefore, I wrote to twelve physicians in various parts of the country, known to me as painstaking, careful, and competent men. I asked them to send me the results of their blood pressure readings, observing the systolic, diastolic, and the pulse rate. After making out cards, I threw out all declined and substandard cases, including in my present number only apparently first-class lives, and my apology for bringing this material before you is that, although the number may not be great, I believe the quality is. There is a total of 1175 cases.

For purposes of comparison I have taken Dr. Mackenzie's figures of the Prudential, and have arranged them in Table A.

TABLE A.

Ages	SYSTOLIC			DIASTOLIC		PULSE PRESSURE	
	Prudential	Equitable		Pruden- tial	Equit- able	Pruden- tial	Equit- able
	1914	1912-1914		1914		1914	
To 19	120	119	122.0	85	80.9	37	41
20-24	123	122	{ ..... 122.5	87	{ .... 82.0	35	{ ..... 41
25-29	124	123		87		36	
30-34	125	124	{ ..... 124.3	89	{ .... 84.5	36	{ ..... 40
35-39	128	126		90		36	
40-44	128	127	{ ..... 128.1	92	{ .... 88.3	37	{ ..... 40
45-49	130	129		91		38	
50-54	131	132	{ ..... 131.9	94	{ .... 90.0	39	{ ..... 42
55-59	139	135		100		37	
60-64	137	137	{ ..... 136.0	91	{ .... 93.7	*40	{ ..... 43
65-69	140	139		99		†50	

It will be seen that the systolic pressure of the Prudential and Equitable varies but little, as it also does when compared with Dr. Fisher's table.

Considering the diastolic pressure, we find the Prudential's results are a trifle higher than the Equitable's, and the thought at once arises to the point at which the diastolic pressure was estimated.

For the purpose of uniformity I requested all of our observers to take the diastolic pressure at the moment when all sound ceased, rather than at the "End tone," or the beginning of the "fourth phase."

I am perfectly well aware that this is not possibly as scientifically correct as to take it at the fourth phase, but when I

\* Only 4 cases.

† Only 2 cases.

realize that it is difficult to get a diastolic pressure on the part of examiners who are seemingly competent to take a systolic pressure, I felt that if there was a point where all sound disappeared, it was a very definite point and most people could tell where that sound stopped; with the exception perhaps of cases of aortic and regurgitant murmurs, we are not very much concerned whether it stops at the end of the zero or not. Sometimes, as Dr. Tiemann has brought out, we have had cases of aortic regurgitation where the murmur persisted clear down the scale, but I believe that where these pressures are to be taken by skilled or less skilled physicians, the practical results will vary less by adoption of this plan.

The practical difference between the two is very small and has but little significance.

TABLE B.

Ages:	NUMBER		SYSTOLIC		DIASTOLIC		PULSE PRESSURE	
	Men	Women	Men	Women	Men	Women	Men	Women
To 19	58	3	122.6	110.7	81.5	69.3	41.1	41.4
20-29	407	54	122.9	119.9	82.3	79.5	40.6	40.4
30-39	326	36	124.7	120.2	84.6	83.1	40.0	37.1
40-49	191	17	128.4	124.7	88.5	86.3	39.9	38.4
50-59	69	5	132.3	125.8	90.0	90.0	42.3	35.8
60 plus	9	...	136.9	....	93.7	...	43.2	...
All ages	1060	115	125.5	120.7	84.7	81.4	40.4	38.9

In Table B we make a comparison of the blood pressure of men and women. The average at all ages for men is 125.5, for women 120.7, while the diastolic pressure in men is 84.7 in women 81.4, giving a pulse in men of 40.4 and women 38.9.

I regret the number of women is not greater, and it would be very interesting if other observers who have accumulated a large amount of data could report their experiences.

TABLE C.

Up to 119 lbs.	120-29	130-39	140-49	150-59	160-69	170-79	180-89	190-99	200 +
Ages:									
To 19	113.2	116.6	120.7	127.3	126.0	125.0	128.5	124.0	130.
20-29	114.3	123.1	120.9	123.2	125.8	124.3	129.4	128.8	134.3
30-39	116.3	118.4	121.3	121.6	126.9	124.2	127.4	126.8	129.2
40-49	129.3	130.0	123.3	131.4	127.6	128.1	126.6	132.0	130.7
50-59		126.2	133.5		126.7	128.4	129.3	133.0	134.0
60 plus				129.5	142.	133.5	136.5	136.0	135.7

In Table C I have endeavored to show how the systolic pressure varies with age and weight. It would appear that especially at young ages the pressure is influenced very largely by weight. For example, among the insured from 20 to 49 years old the systolic pressure varies from 114 to 134, according to whether the subjects weigh less than 120 pounds or over 200 pounds. On the other hand, among the insured with a weight of 150 to 159 pounds, the blood pressure averages vary only from 125.8 mms. to 127.6 mms., for all age groups up to age 59.

It would seem that a more marked variation in pressure is caused by weight than by age. An extended analysis from this viewpoint might demonstrate that the increase of blood pressure with increase of age, as shown in Table A, would partly vanish. The practical point is that the blood pressure does not increase materially with age among standard risks.

Is it not inadvisable to be more lenient in blood pressure requirements in the older applicants?

TABLE D.

110 to 119 lbs.	120-29	130-39	140-49	150-59	160-69	170-79	180-89	190-99	200 +
Ages:									
To 19	75	80	85	84	81	95	90	92	90
20-29	73	81	82	84	82	85	81	89	91
30-39	77	83	80	82	86	86	86	86	91
40-49	87	91	85	91	88	89	85	90	88
50-59	89	89	90	97	84	87	94	89	91
60 plus				88	127	89	84	85	98



In Table D, showing how diastolic pressure varies with age and weight the same thing is noticeable.

It seems evident that up to age 39 the blood pressure averages show little or no increase with age, but they do show a marked increase with the weight of the subject. In other words, may not the apparent increase of the blood pressure up to age 39, as shown in Table A, be really due to the increase of the subject's average weight.

At ages over 40 the blood-pressure increase seems to be coincident both to increase in age and increase in weight, but more to weight increase than to age increase. Of course we must remember that cases in excess of 150 mms., and below 110 mms., are not included in this tabulation.

TABLE E.

110 to 119 lbs.		120-29	130-39	140-49	150-59	160-69	170-79	180-89	190-99	200 +
Ages										
To 19	77	79	76	74	75	83	68	74	77	80
20-29	75	76	75	75	74	75	77	75	75	77
30-39	75	74	75	76	76	74	76	76	76	74
40-49	78	77	77	75	72	74	75	74	77	76
50-59	77	72	71	75	72	73	76	75	70	77
60 plus				67	72	74	78	74		84

Table E, showing how the pulse rate varies but little with the age and weight. For it is apparent that from the young ages to the older, from the light weight to the heavy weight, the normal pulse rate is about the same, showing the difference between the pulse rate in this respect and the blood pressure.

We have searched a large number of declined cases with abnormally high blood pressure and have been unable to demonstrate that the pulse rate was influenced by increased blood pressure.

TABLE F.

Other Causes	CAUSES OF REJECTIONS		Total	
	High Blood Pressure (150+)	Low Blood Pressure (110-)		
No other cause	331	36	367	24.7%
Heart	172	25	197	13.3
Kidney	448	19	467	31.4
Heart and Kidney	139	6	145	9.8
Heart and Lung	19	1	20	1.3
Lung	24	14	38	2.6
Rheumatism	5	—	5	0.3
Non-conformity	22	4	26	1.8
Miscellaneous	167	53	220	14.8
	1327	158	1485	100.0%

I have noted in Table F some 1485 cases which were declined on account of blood pressure above 150 and below 110, adding also any contributory reasons for adverse action.

Renal and circulatory diseases caused by far the largest number of rejections, where abnormal blood pressure occurred. Whenever abnormal blood pressure was complicated by some other impairment it was one of renal or circulatory nature in 83% of the cases.

Dr. Porter—This discussion of Dr. Rockwell's has been very interesting and it gives an added value to our information. I will now call upon Dr. Gordon Wilson to continue the discussion.

Dr. Wilson—Mr. President and Gentlemen: The question of low systolic pressure I think deserves consideration, and it should be looked upon as an important impairment where there is a question of family history of tuberculosis or of underweight or of those diseases which we usually associate

with tuberculosis. About five years ago in a large tuberculosis hospital outside of Baltimore, where something over seven hundred cases are treated a year, I became interested in taking the blood pressure readings in every case, systolic and diastolic. I have not yet tabulated these 3500 cases but there is much more than an impression in my mind that the blood pressure readings, both systolic and diastolic, in those suffering from tuberculosis were distinctly lower than in the average class of patients. Last November, our company got out a new blank requiring both the systolic and the diastolic pressure in every case, and we sent letters to our examiners instructing them how to take the blood pressure. Unfortunately I did not realize what Dr. Rockwell has brought out, namely, the question of having the average man understand what is meant by the beginning of the fourth phase. Almost all of our business is written in rural districts, and I find so many cases where the systolic pressure is given as 125 and the diastolic as 120, which makes me realize that the figures are not worth the paper they are written on as far as the diastolic pressure is concerned. The diastolic pressure, however, is of extreme value in a certain group of cases, and that is the group where the systolic runs from 140 to 160. I think that all clinicians who have followed these cases over a period of years realize that it is in this group that our diastolic will help us. In other words, where we have a diastolic of 110 or more, with a systolic of 145 to 160, we are dealing with a permanent change which is not influenced by time or treatment. On the other hand where we have a blood pressure of 160 and a diastolic pressure of 85, it is very apt to be a temporary condition, and we have established a rule that where the blood pressure readings come from a reliable examiner, and the systolic pressure is 145 or more, if the diastolic is below 110, we consider that case favorable for further readings. If, on the other hand, the diastolic is above 110, we get further readings, but our records justify the impression that a high diastolic means a permanent condition more or less. There is nothing further that I can bring out of interest, except one little point,

and that is that during this past summer I had an opportunity to study some 76 normal individuals, rather young. They were supposed to be normal, but as Wassermans were taken in every one of these cases, I think it might interest you. It was a small school outside of Baltimore for colored girls, average age 16, average length of stay three years. They thoroughly investigated every one of the girls and took Wassermans—out of 76 there were 6 positive Wassermans, and one in which there was a history of Wasserman prior to admission but negative at the time of our examination. Among those 76 girls three had blood pressures of 140, 142, and 165. Not one of these three had a positive Wasserman or anything suggestive of syphilis. I lost a bet as the result of this investigation. Dr. Pleasants and I were talking about the question of evidences of syphilis in positive Wassermans, and I thought I would be able to pick out a group in which we would be able to get a positive Wasserman. We went over them thoroughly, hair changes, eye changes, glands, heart, neck, etc., girls stripped to the waist, everything taken into consideration. In a group of 52 which I thought was suspicious, we could find nothing. The Wassermans were all in a group of 24 which I thought were not suspicious!

Dr. Porter—Dr. Phelps has just been called away, and he requested me to make the suggestion that if it met with the approval of the Association a form be drawn up which could be adopted by the companies and distributed by them to their examiner, instructing them how to take the systolic and the diastolic pressure. He suggests that as the companies increase the general adoption of the systolic and diastolic pressure as a requirement, we wish to have it as effective as possible, and he thinks such a form of instructions would be very helpful. I submit the suggestion on behalf of Dr. Phelps for your consideration, and for any comments which you may perhaps wish to make. Are there any remarks bearing on this suggestion?

Dr. Patton—I have a copy of a circular letter which we have been sending out to our examiners since last May, de-

scribing the method of taking the blood pressure, and specifying the diastolic as well as the systolic, and we have now under preparation a small pamphlet of from eight to twelve pages which we expect to send to our examiners.

Dr. Porter—You have not a copy with you?

Dr. Patton—No, but I have a copy of the letter which we send.

Dr. Porter—May I suggest that you embody the reading of that letter in your discussion?

Dr. Patton—We have been attempting to pay more attention to the diastolic for the past year or year and a half, than we did previously, and we feel that it is about time to begin to train our examiners. During the past five years, examiners have been quite thoroughly trained in taking the systolic pressure as shown by the average results in the large number of reports that have been rendered to the various companies. Since the introduction of the auditory or auscultatory method of taking the diastolic pressure there is no reason why any examiner who can use the stethoscope cannot be trained to take the diastolic pressure,—at least that is our assumption. The only difficulty I can recognize in regard to the diastolic is just exactly the phase to take—the fourth or fifth phase. Dr. Rockwell is inclined to think that the fifth phase is the preferable one. We have been instructing our examiners to take the record at the beginning of the fourth phase, and in special cases to also give us the fifth phase record.

I was interested in reading the other day a clinical account by Dr. Arthur Elliott of Chicago, in the *Journal of the American Medical Association* of September 18, 1915, in which he states that there was no reliable diastolic record prior to adopting the stethoscopic fourth phase method. Dr. Elliott divided his blood pressure cases clinically into five groups:

1. The secondary or symptomatic high blood pressure.
2. The neurogenic high blood pressure.
3. The essential high blood pressure.
4. The nephritic high blood pressure.
5. The high blood pressure heart failure.

The neurogenic cases are those without any physical signs. Cases with or without albumin form clinically two different groups—the essential groups being the non-albuminurics, and they show a distinctly lower blood pressure than the albuminurics. He recorded 21 deaths in 130 cases, and 19 were albuminuric cases, only 2 being non-albuminuric. The causes of death were heart failure, uræmia, and apoplexy. There was a persistent high diastolic in the uræmia and apoplexy cases. He concludes by saying that every patient with a high blood pressure is a cardiac invalid and actually becomes one if he lives long enough.

In pursuance of our method of writing our examiners, in cases where we feel that a systolic record of 125 and a diastolic record of 120 mean nothing, we have written the examiner, and we have met with some good results. I have here a letter from one of our examiners in a country district who reported a systolic of 155 and no diastolic. We wrote to him and he replied that he had not been accustomed to taking the diastolic, and had tried to take it by the palpation method. After receiving our circular letter he saw the man several times, and he reported a blood pressure of—systolic 145, diastolic 85, using the auscultatory method. He had made a half-dozen observations of the man during two days, not only to assure us if possible of the condition of the man, but also to work out his own method of taking the diastolic pressure. And this is only one of a dozen or more examiners from whom we could quote during the last six months.

The letter we are sending to our examiners is as follows:

DEAR DOCTOR:

With a view to obtaining uniform and accurate readings with the sphygmomanometer, please observe the following:

Have the applicant seated, with his left arm resting comfortably on some convenient support. See that there is general muscular relaxation and that his mind is free from anxiety or apprehension. Nervous influences, by raising the pressure many mm. Hg., may cause abnormally high readings.

Bare the left arm and apply the cuff on a level with the heart, drawing it sufficiently tight to prevent slipping, but in so doing avoid compression of the arm, and then connect the instrument.

Use auscultation for taking the readings. It is more accurate and easier than palpation, and on this account is preferable. The method is as follows: Place the stethoscope over the brachial artery at the bend of the elbow, just below the cuff. Gradually inflate the bag. Pulsation in the artery will soon be heard. Continue inflating the bag, gently, until the mercury or needle (depending on the instrument used) is 5 to 10 mm. above the point on the scale where the sounds are lost. Slowly release the air and closely observe the scale of the instrument. The reading when the first sound is again heard, as the mercury or needle returns, is the **SYSTOLIC PRESSURE**. Continue to let the air escape slowly. The tones increase in strength as the pressure falls and then, suddenly, drop to a dull tone and a few mm. farther down the scale disappear. The reading at the *point of maximum intensity just before the sound drops to the dull tone is the DIASTOLIC PRESSURE*. The difference between the systolic and diastolic pressures gives the **PULSE PRESSURE**, which represents the maximum amplitude or range of the pulse. High systolic pressure (over 150 mm.) points to the possibility of circulatory or renal disease, either alone or combined, and indicates minute inquiry and examination for subjective and objective symptoms of impairment of these systems. Low systolic pressure (under 105 mm.) with low pulse pressure (under 25 mm.) is suggestive of tuberculosis and should lead to very careful search for this disease.

Check the first observation with two more, being sure to let all the air escape from the bag between each. Long continued compression of the arm raises blood pressure and makes the applicant uncomfortable.

Please give two diastolic readings, first at the point of maximum intensity as indicated above and second, at the point of disappearance of all sound.

In each case give us the name of the instrument used, the

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width of the cuff and the time of day at which the reading was taken.

I remain,

Very truly yours,

WALTER A. JAQUITH,  
*Medical Director.*

We have now in preparation a small pamphlet going a little further into the details, giving some of the results, and the reasons why we want the diastolic readings taken; this we hope to have ready in a few weeks for distribution to our examiners. We shall be very glad to furnish the Committee with a copy.

Dr. Porter—I am sure we would all be very glad to hear from Dr. Van Wagenen on this subject.

Dr. Van Wagenen—I did not have any special report prepared, but there are two or three points that strike me as interesting. The figures which Dr. Fisher gives us to-day conform to the figures in the original report of your Committee at Philadelphia in 1913. It is very important to note that these figures compare so exactly as to prove that they are correct. They bear exactly the same relation to the proof of correctness that a comparison does between the figures which Dr. Fisher gave of his own company, of the Prudential, and of our company, which showed that the variation was so small one must conclude that we were getting accurate figures; and a mortality of 264%, since 1907, on those who had high blood pressure and one or more impairments, should convince us the necessity for the blood pressure test is no longer an open question.

Another interesting subject was the discussion of the diastolic pressure. That question was carefully considered by the Committee who reported at Philadelphia, and it was deemed unwise at that time to suggest the use of the diastolic record for the reason that we feared it would be incorrect. I do not think there was any question of the value of having the diastolic record, it was only a question of getting a record which



would be reliable. One gentleman of the Committee, I remember, urged very earnestly that the diastolic record be included in our recommendations; but the majority overruled and it was left out for the time. I agree that after two years, with the experience that we are getting correct records of the systolic pressure, that question is put into a very different light to-day.

Another interesting point brought out to-day is the relation of systolic pressure to the height and weight. This was not considered at all in our original report, but I think it is very important. It is certainly noticeable that the highest death rate among the high blood pressures occurs about at the age when the death-rate from overweight is highest. I was much interested in a record of our deaths for the last ten years. During this ten years' record of deaths, including some 17,500 losses, four tenths of all occurred from cardio-vascular-renal disease. It makes little difference to us from a life insurance point of view whether a man begins this circle of disease with an apoplexy or a chronic heart trouble or with kidney disease, if he lives long enough he will develop *all* those different troubles. Our losses were, one in eight from apoplexy, one in six from chronic heart trouble, and one in nine from chronic nephritis. If you combine these, it gives us almost one in three of all deaths that have occurred in the last ten years, due to this class of diseases; and it is against this very class that the blood pressure test seems most valuable.

Dr. Fisher's figures show that 82% of his deaths where high blood pressure occurred were from this class of diseases.

As to the value of the diastolic pressure, I think that has been pretty thoroughly proved and the difficulties of recording it are partly removed; but as to requiring it now from our examiners, I cannot help feeling that we should be very careful and, if called for, it should be distinctly understood at what point the diastolic pressure is to be recorded. In other words, if we are not careful in giving directions to our examiners, it will be a practical impossibility to compare the figures or records of the different companies. That point was one

especially made in the report of the Committee of 1913. We were exceedingly anxious to have all the companies report their systolic pressures taken in exactly the same way, and under the same conditions, in order that we might compare figures one with the other and get uniform results.

Dr. Porter—I thank you very much, Dr. Van Wagenen. As one of our charter members who has always taken an active part in our scientific deliberations and whose judgment we all respect very highly, you make the statement that you are satisfied that there can be no question about the wisdom and the value of blood pressure readings. I am prompted to read the reply to a communication which I sent to one of our members urging that he participate in this discussion.

Having had it intimated to me that there was a member of our Association who believed that the sphygmomanometer was of no value and that he had the courage of his convictions and was ignoring its use practically I thought it would be an appropriate time to call upon him to enter this discussion, particularly when I found what a valuable addition we were going to have to Dr. Fisher's reports. So I wrote making the request and I will read simply one paragraph of the letter bearing upon the subject:

"Concerning Dr. Fisher's paper on blood pressure, I will not be prepared to give any statistics at this time, but I am accumulating data from which I hope to prepare a paper at some other time which I believe will support my viewpoint that the sphygmomanometer is of no value in life insurance examinations."

In view of this and as Dr. Muhlberg is present, I will be very glad to call upon Dr. Muhlberg although he may not feel in position to represent at all Dr. Davis's views. Perhaps he will give us his own views, if they are at all in accord with the practice of his company, so that we may have a line as to what all this means, so absolutely at variance with anything that has come up at this meeting and that is coming up constantly from an agency standpoint and causing discontent and raising a question as to the wisdom of all this accumulated

evidence. Just a few words by Dr. Muhlberg would be much appreciated by us all.

Dr. Muhlberg—Mr. President and Gentlemen: I am scarcely prepared to discuss this paper. I regret very much indeed that Dr. Davis himself is not able to be present to defend the statements that he has made in his letter.

Personally I wish to preface anything I have to say with the remark that before I became associated with the Union Central Life Insurance Company I had ambition to become an internist and for that purpose studied from five to six years as physiologist both abroad and in some of our Eastern colleges, and it so happened that I was thrown in with men doing research work particularly on the circulation—among them Dr. W. T. Porter of Boston, who I think is considered the authority on the physiology of the circulation in this country. Naturally I was very much interested in the question of blood pressure, having done a great deal of experimental work on animals along that line, and when I joined the Union Central I was enthusiastic on the subject of blood pressure and I believe I was the first in this country to construct an apparatus for the study of the blood pressure along the lines of Mosso's instrument, while I was doing some research work in Harvard back in 1899. When I was appointed Assistant Medical Director of the Union Central in 1907, I discussed the matter with Dr. Davis and he also took up the subject rather enthusiastically although I told him frankly that there were certain practical difficulties that must be taken into consideration—difficulties which obtained at that time but possibly do not obtain now. In the first place at that time there was the imperfection of the instruments. I found the instruments utterly inaccurate—so inaccurate that a physiologist would not touch them. Then, secondly, I taught the subject of blood pressure to my classes in physiology—to students who were skilled in the use of the sphygmograph, plethysmograph, and other physiological apparatus. I had an average class annually of forty to fifty men and I had no confidence, in spite of the fact that I devoted three or four days to the de-

monstration of this instrument, that half of these men could make accurate blood pressure determinations.

I presented these facts to Dr. Davis, and he said, "Well, let us try it out," and we did try it out, and I think for a while the Doctor was very enthusiastic on the subject, but for the reasons as I have indicated, he lost interest in the matter. Perhaps too it was a business reason. The mortality of our company is pretty low at the present time. We appreciated that if the sphygmomanometer was of value it would necessarily mean the declination of many risks that were now accepted, and we had no desire to increase our declination ratio—a tightening up in that respect meant a loosening up somewhere else. Our agents are pretty well drilled in other matters with reference to selection of their prospects and the introduction of blood pressure requirements seemed needless. He said, let us treat the matter in this way: We will not take the blood pressure but we will guard ourselves against it in this respect at least, that where we have a report of high blood pressure against an applicant, we will examine the urine very carefully on the theory that most of these cases are really nephritic cases, and that the high mortality is due rather to the coexistence of chronic nephritis than to the blood pressure, *per se*. And that, gentlemen, is an important physiological consideration. Blood pressure can be raised in several ways. You cannot raise the blood pressure by the constriction of the arteries outside of the splanchnic area only. With the exception of the cerebral and splanchnic vessels you can ligate every artery of the body and the blood pressure will remain practically normal. A rise in blood pressure results from an increase in force and frequency in the heart action, an increase of fluid in the circulatory apparatus, or an increased constriction in the splanchnic arteries which may be due to nervous constriction or it may be due to a Bright's disease which probably in itself does not raise the blood pressure through any disturbance of circulation through the kidneys but because in some way which pathologists do not understand the blood-flow through the arteries

is obstructed. Therefore, Dr. Davis believes that most of this high mortality is an association of kidney disease with high blood pressure but where the blood pressure is not dependent upon kidney disease it can be practically ignored. There is no question but that a high blood pressure may be at times purely neurotic. Due to excitement, neurasthenics will show a rapid rise of blood pressure while they are under observation—there is absolutely no doubt of that. Now what has our actual experience been? I am sorry that I have not figures to present or any studies to present because our material is not extensive enough nor our death losses numerous enough. We have, I think, as a very conservative estimate, 800 policyholders, and perhaps 1000, against whom there has been reported a high blood pressure. In all of those cases we have requested three samples voided on different days. Roughly I should guess that the average time those policies have been on our books, about two and a half years, making an exposure of 2000 years of insurance. We have had two losses in that group, one loss due to mitral insufficiency and the other to pernicious anæmia which probably bears no relation to the high blood pressure. Now it is possible that the fates may be playing against us and temporarily at least giving us a low mortality. The fact, however, remains as I have stated. I believe that sometime in the future we will be able to give you very valuable statistics with reference to this point. I think that in the next few years, if Dr. Davis continues his present practices, we will have two or three thousand of these cases on our books, and we will be able to follow them in a much better way than Dr. Fisher has been able to follow his cases; and I believe that our study will be of importance to you, especially whether blood pressure has any significance in the absence of a careful urinalysis. I need not repeat the statement that I have so often made, that I have absolutely no confidence in a microscopical examination that is not made at the Home Office. All of these urinalyses were made at our Home Office. I think, therefore, that you gentlemen ought to be very patient with Dr. Davis during this period

when he is collecting material that is going to be extremely valuable to you. He is a man of a great deal of courage, a strong character, and if he is wrong he will read a paper before this Society and will admit that he is wrong. On the other hand, if he is right I am equally confident that on account of the Welsh blood in him he will not miss reporting it!

This circumstance must be taken into consideration. We have been doing microscopical work in our office and we have been very liberal in our rulings, as I indicated in the discussion this morning, just as liberal as Dr. Ogden has been and Dr. Ogden has been criticized somewhat for being too liberal. We have not lost a case from Bright's disease or from diabetes within three years after an urinalysis was made at our office. An astonishing number of Dr. Fisher's cases have died of cardio-vascular diseases, and I believe that if Dr. Fisher cuts out from his list of cases the early losses from Bright's and diabetes which we have not had among our average run of applicants nor among those cases against whom a high blood pressure has been reported, Dr. Fisher's mortality would be very favorable instead of very unfavorable, so that I believe that the data which Dr. Davis will be able to submit to you one of these days will show whether or not blood pressure has any significance in the absence of renal changes. I am inclined to believe that the pendulum has swung pretty far in your enthusiasm with reference to blood pressure. There was a time and still is when the majority of you gentlemen would turn a man down for a trace of albumin or a few casts. I think that it is unjustifiable, almost a crime, to decline an applicant who is a good risk if that man needs insurance, and after all, as Dr. Dwight indicated in his paper yesterday, it is the function of the Medical Director not to put up too many barriers against obtaining insurance. The skillful Medical Director is the man who can safely pull down these barriers, if possible, and permit people to get insurance. That is the function of the insurance company and therefore if you are turning down thousands of men in this country on account of blood pressure alone, without further investigation

or study, you are certainly doing them an injustice. One point impressed me very strongly while I was teaching and that was the psychology of the student with reference to different subjects taught during the freshman year. There are some students who will learn anatomy without difficulty but can't acquire physiology. Some students are just the reverse and will learn physiology but not anatomy, because they cannot memorize. There are some men who do beautiful work in chemistry but not with physical apparatus, and vice versa. I believe that there are many physicians who can take blood pressure and make good blood pressure determinations but who will overlook albumin in the urine, and vice versa; and I think that many of these cases where you are getting high blood pressure are in reality renal cases in which the examiners have overlooked the fact that there is albumin or casts in the urine, and if these cases were eliminated the mortality would not be so unfavorable. At any rate, our mortality has so far been favorable—I think you will admit that—two losses and an exposure of about 2,000 years. Now I do not wish to hazard any prediction as to what that mortality will be in later life. It may be high. I would be willing, however, to wager that it is not going to be so and I trust you will wait patiently until our studies are completed.

Dr. Porter—I understand correctly, Dr. Muhlberg, that your routine practice is where you have reason to believe that a high blood pressure has previously been found, that your regular requirement is to examine three specimens chemically and microscopically at the Home Office in each case that you accept?

Dr. Muhlberg—Yes, that is correct.

Dr. Porter—This information is of interest and it should be given serious thought and consideration, and I would ask Dr. Cook, as he is to continue this discussion, if he feels at all in a position to do so, to refer somewhat to the line of thought that has been presented so ably by Dr. Muhlberg.

Dr. Cook—Mr. Chairman: I feel that I can add very little to the value of this discussion, although I have here a very short paper which I prepared at Dr. Fisher's suggestion.



While we must recognize the very high order of talent which exists in the Home Office of the Union Central in Cincinnati, and I think there is no higher anywhere, yet to my mind we should as readily think of questioning at this date the value of blood pressure as the value of a stethoscopic examination of the heart, or of the urinalysis, or of any one of our definitely established clinical procedures.

The explanation of the Union Central's favorable experience over a few years with the group of carefully selected cases of high systolic blood pressure undoubtedly lies in the fact that they are so rigorously selected, in the same way that Dr. Ogden's figures show an experience more favorable than the average with certain carefully selected groups of albuminuria and cylindruria cases. To argue on the basis of the Union Central's experience in a select group of high systolic blood pressures approved only after several home office negative urinalyses, that high blood pressure is therefore a good symptom or at least a negligible symptom—would be as illogical as to argue from the Metropolitan's experience in a select group of albuminurias that albumin is a favorable or a negligible symptom.

Until the Union Central accepts cases of high blood pressure under the same requirements in regard to examination and urinalyses as their average run of business, their comparative figures are valueless. As a matter of fact, the trouble and expense to which the Union Central goes to obtain special and extra urinalyses in cases of high blood pressure show conclusively that they do in practice consider blood pressure readings of considerable value in selection.

I feel that Dr. Fisher has not *to-day* put the stamp of positive proof upon the value of blood pressure, but that he did it several years ago, and I think that the mass of material that has accumulated in the course of clinical observations is only confirmed and emphasized by Dr. Fisher's paper. I therefore feel that to argue at this date as to the general value of systolic blood pressure readings is a waste of time, and if we had to give up one established feature of our examinations, I would



not know which one would be a greater loss than the sphygmomanometer.

Can we not unhesitatingly accept our Blood Pressure Committee Chairman's dictum that the value of a knowledge of blood pressure has been proven beyond a doubt, and cannot we henceforth devote our attention to a study of increasing accuracy of estimation, particularly insisting upon the auscultatory method, more definite ratings for successive increases in systolic pressure, a further analysis of low pressures, and a gradual compilation and study of statistics on diastolic pressure and pulse pressure?

In considering hypertension, we have to think of the high pressure as more than a sign of some underlying disease, as for example we would think of albumin as an indication of renal disease. High blood pressure is more than a sign,—it is a condition which of itself threatens the integrity of the vascular system.

We have all been surprised, in our blood pressure experience during the past twelve years, at the unexpected behavior of some of these high tension cases. The problem has not proved as simple as it seemed at first. Individual cases have shown a wide and almost inexplicable variation from the simple mechanical interpretation that we were at first inclined to put on successive increases in systolic pressure, and which, at first sight, would seem to be borne out by Dr. Fisher's figures,—that is, that each additional 10 mm. of mercury in systolic pressure deducted a certain amount from the expectancy. But individual cases with blood pressures of 180 and 190 mm. Hg. lived along very comfortably and happily year after year, in spite of our gloomy forebodings, while others with systolic pressure of  $150 \pm$  dropped out suddenly. In other words, our classes of high systolic pressure do not appear to have been homogeneous.

I believe that our failure to differentiate more accurately between the favorable and the unfavorable cases of high systolic pressure has been due to our neglect of the diastolic pressures. We have been seeing only the big strain against which

the heart was laboring; we have paid no attention to as vital a point, which is, whether the heart is capable or incapable of meeting and overcoming the strain. The secret of prognosis in these cases lies in the heart muscle, as we long since have recognized in cases of valvular disease.

A low or moderate diastolic pressure and, therefore, a wide pulse pressure, in these cases of high systolic pressure, indicates that the heart is strong and vigorous, and that the strain is not maintained on the vascular system. A high diastolic pressure, on the other hand, means that the heart is laboring at its full capacity and the strain is not relieved during any part of the heart cycle.

Clinical observers agree that frequently as the heart muscle fails the diastolic pressure rises though the systolic may be falling, and if only systolic pressure were being observed, the case would seem to be improving, when in reality death might be impending. Those are the cases of high systolic pressure which make the groups show so unfavorably. As such a case of muscular weakness improves, say under digitalis, and the diastolic falls, the systolic may rise, but they are better risks with the higher systolic reading.

Careful investigation is being made at the Mayo Clinic on this point. They have come to feel a very great respect for high diastolic cases. Dr. Plummer recently showed me reports on a number of the recent fatal cases from different causes, and a surprising number showed diastolic pressures over 110 mm. Hg. In fact, I recently heard Dr. Charles Mayo make the statement in a paper at Rochester that he would feel safer in operating on a patient with a systolic over 200 mm. Hg. than one with a diastolic over 110 mm. Hg., and he unhesitatingly says that he regards the diastolic as the more trustworthy reading in warning of serious cardiac cases.

I feel that we would make a serious mistake if we did not require the diastolic pressure, as soon as we feel it could be accurately obtained from the examiners, and I trust that our Blood Pressure Committee may be continued, in order that they may add, as soon as sufficient data is available, a definite

report on diastolic readings to supplement the magnificent report on systolic pressures. I also cannot help but feel, in view of the very definite clinical experience that hypotension is associated with tuberculosis, that we will be able gradually to apply a knowledge of hypotension with greater accuracy and certainty, and that our present feeling of uncertainty is because we have been inclined to place the normal minimum pressure reading too high. Cases probably cannot be considered abnormal if at or above 105 mm. Hg.

Dr. Dwight—In the first place, I should like to congratulate the Union Central on their Assistant Medical Director, and I think Dr. Davis is very much to be congratulated on his representative here. I do not wish to have him go home thinking that he stands alone in his ideas. The New England Mutual has been doing and is continuing to do just about what Dr. Muhlberg does with blood pressure. We have changed our rules—perhaps we have not Welsh blood in our veins—but we have changed them—not because we have materially changed our ideas. To my mind it is not at all certain that the blood pressure question is quite as definite as most of the gentlemen here believe it is. I cannot prove that they are not right, but they have not yet proved to me that we are entirely wrong. As I have explained before why we did not take blood pressure it is not necessary for me to go into that subject now, because Dr. Muhlberg has stated it much better than I can. It may be of interest to Dr. Muhlberg at least to know why we are taking blood pressures. It is not to protect the company against a high mortality. We too have a reasonable mortality, as low as we want it. We disliked to take the blood pressure because we felt that it was going to mean a larger percentage of declinations; but we issued instructions to our agents and to our doctors requiring blood pressure under certain conditions, in order to diminish our percentage of declinations. We found that being the only company about that was not requiring blood pressure, the agents of other companies turned over to us all their dead-wood and every man connected with the Northwestern or the

New York Life or the Mutual or the Equitable who had a good case—or a case he thought good from his standpoint—turned down on account of blood pressure and that alone, brought it to us. I don't think many of them got through, but we had to pay for a lot of urines, it raised our expenses very materially, incidentally it brought to us an undue proportion of bad risks, and it increased and has increased for the past three years our percentage of declinations; so that in order to protect ourselves and our agents from your agents we have introduced in certain cases blood pressure readings, not because we needed them to reduce the mortality but purely for the reason I have given and at the request or insistence of the Executive Officers.

Dr. Van Wagenen—I spoke pretty enthusiastically about blood pressure, but I want to say that enthusiastic as we are about blood pressure, we do not by any means neglect the other tests—for albumin and the microscopical examination of the urine. We decline every case that has albumin and casts in the urine. We look into that very carefully. All the microscopical examinations are made at the Home Office and by an expert, and we watch very carefully the chemical work done by our examiners. Indeed if we are at all suspicious about a chemical examination, we have a specimen sent to the Home Office and examined there by a man whom we know is as capable as anyone may reasonably be expected to be to do that class of work. Much as I appreciate blood pressure I would not for one moment relax on the other points, but if we find a case that has occasional albuminuria, occasional hyaline casts even, or particularly granular casts, and also a high blood pressure, we feel very willing to turn that case over to Dr. Dwight or to our friend, Dr. Davis.

Dr. Symonds—I just want to say a word. I admire Dr. Muhlberg's loyalty and the way in which he defends the action of his chief, but when you come down to brass tacks, nine out of ten of the suspicious cases they have had with high blood pressure were furnished by the M. I. B. Therefore he was being protected by the M. I. B. His company is protected

by that. It is not protected by the repeated examinations. He takes out those cases that are reported with high blood pressure by the M. I. B., and then submits them to a rigid test of the urine, and probably selects them with great care in other respects, and he will get a low mortality under those circumstances; but suppose he knew nothing of high blood pressure reports that were furnished by the other companies—how do you think you would stand in that case, Dr. Muhlberg?

Dr. Muhlberg—Of course there are two contingencies. The one is, assuming that no company required blood pressure,—in that case of course we would be no worse off than we were before the blood pressure was made necessary. The other contingency is that other companies are requiring blood pressure but there is no M. I. B. Assuming that there is no such thing as an M. I. B., those cases would then of course be short-circuited through our company, and I think you are perfectly right, Dr. Symonds, that our mortality among those would be high.

Dr. Symonds—You would not have the protection, and you would not make your urine examinations or take the other precautions. Therefore when the claim is made that there is a low mortality in that class, I think it needs to be taken with that grain of salt that I have tried to inject into this discussion, and that is the reason why I think Dr. Dwight has put up his bars.

Dr. Muhlberg—What we hope to prove, if our experience is favorable, is that the high blood pressure will merely indicate to the Medical Director, as it does I believe, that a careful urinalysis must be made, and if our mortality continues favorable, it simply means that where there is a high blood pressure, a very careful urinalysis must be made and a careful selection must be made among those cases.

Dr. Dwight—I do not think Dr. Symonds is perfectly right. Dr. Symonds and myself have been on one committee for eight years and we have never thought the other man was quite right, still we like each other very much. It is practically

within five years that we have been getting this large number of reports on blood pressure. Previous to that time, the New England Mutual had started with a considerably higher mortality and we have reduced it among other things by our urinary work as much as by any other two things. Then came along the blood pressure. We continued the same policy, only examining those cases that I have mentioned. We have not changed our mortality, and the only thing that has happened, as I saw some figures which Dr. Blakely drew off, is an increase in the percentage of declinations, and in the cost of the Medical Department. Now I don't mean that those reports are of no value, but I do mean that it would be just as fair for you to say that they are of no value except to increase our declinations and to increase our expenses as it would be to say that our saving in the Union Central and in the New England Mutual is entirely due to the reports of other companies. It is partially due to both, it has an influence and a value, and we are very glad to have you give it to us, but it is not a fair game to charge either one of them up against the other.

Dr. Muhlberg—I wish of course to acknowledge the *noblesse oblige* on the part of Dr. Dwight in so nobly assisting me in this very difficult situation; but I will say this, and it is difficult to understand, that where an agent places an application in some company that declines it on account of high blood pressure and the report comes in of high blood pressure only, we have been astonished by the number of cases that show definite albumin and casts beyond our standard, which is pretty liberal. It is a large proportion—I am only guessing but I think it is something like thirty to thirty-five per cent.—and for that reason you are protecting us.

Dr. Porter—That is an interesting point. Dr. Fisher will close the discussion.

Dr. Fisher—It is evident that we are pulling chestnuts out of the fire to-day. I would like to ask Dr. Dwight why it is that in so large a number of these cases which he finds he could not take, he has got to pay a fee for an unnecessary medical examination?

Dr. Dwight—For the very reason just spoken of by Dr. Muhlberg. In nearly 80% of those there will probably be shown a urine which to our mind is not normal, perhaps 50% in albumin and casts, and the other 30% in low solids or low specific gravity. The vast majority of those cases will show a condition which we will not accept.

Dr. Fisher—I do not suppose that the doctor thinks for one moment that the Northwestern Mutual does not get a sample of urine examined just as they would at their own Home Office. The trouble with the Northwestern has been that just as quickly as we found a high blood pressure, they would not furnish us with a urinary examination, but they would take the applicant to a company that did not require blood pressure. I have in mind several large cases that I could relate to you if I had the time. A case just comes to me now of a man that we insured for \$25,000 in 1910, and in 1912 he applied again for \$75,000, making our limit. Our two examiners found nothing but a blood pressure of 164. The agent wrote in and wanted to know if I would not keep the case under observation, as this man had not been sick since 1910. I assured him that this might be a case where the blood pressure would come down, and told him certainly we would keep him under observation. In a couple of weeks the case was called to my attention and I asked the agent why he had not furnished any further blood pressure readings or sent in a sample of the urine, and he said that he had gone over to such and such a company and got \$75,000 on the Ordinary Life plan. Two weeks ago we paid \$25,000 and the other company paid \$75,000 on a death loss.

A couple of days before I left home I went over some of our cases, and I found we had an old policy on a man we had declined in 1913. I reported his case to-day—a man 38 years of age. We declined him for \$20,000. We examined him at the Home Office, he had nothing but a blood pressure of 200. We could not find anything else. We kept that man under observation for three or four months, and finally albumin showed up. Now if we had taken your method of handling



that case we would have had him on our books for \$20,000 more, and he is now dead. There was another case on the same day, where we declined a man for \$18,000 because of blood pressure, and we had an old policy on him. Therefore in the one day we saved \$38,000 on those two cases.

Now we have good chemists at our offices, and there is never a case of high blood pressure and nothing else reported but we send for a sample of urine, and we get just as many samples as we possibly can. We can keep these cases under observation a great deal better than we used to, because a great many of the companies are requiring the blood pressure, and we do not decline a man until we have exhausted all means of determining as to what that means, but there is no question that your blood pressure tells you something that is there that you cannot discover by any of our present methods of diagnosis, and it is not the urinary examination alone that will determine it. That is neither here nor there, however. Every company can work along its own lines. The Northwestern will continue along these lines with the information we have here until we find something better.

I intended to explain with regard to these statistics that in those 302 cases, where I stated that there were thirty that we could get no track of, we have considered those men alive, and we have given them credit for the expected, just as we have in the low blood pressure cases that we have taken off and that particular policy has lapsed. We go through our records and find whether he has a policy with us or not, and if he has he is considered as alive until we can determine that he is dead or that his policy has lapsed out and there is no means of our getting any further track of him. In the same way with the 521 cases with an average blood pressure of 152, if that particular policy has lapsed out, and we find that he is insured with us or with any other company, we consider that man as alive and he is counted in these figures accordingly.

Dr. MacKenzie misunderstood my statement when he said that we would consider 12 mm. of pressure over the average for the age as perfectly normal risks. We never have consid-



ered 150. We have always investigated it. At no time have we taken such cases since 1910—we found out what our mortality was on those 501 cases and we have never taken a blood pressure of 150 or 15 mm. above the average.

There has been a great deal said this afternoon in regard to the diastolic pressure in clinical cases. We are not really dealing with clinical cases. We are dealing with people who suppose they are insurable, in good health, and applying for life insurance, and there is where I claim that we get the value from the blood pressure reading that these companies do not get who depend simply upon urinary examinations.

Dr. MacKenzie (closing the discussion)—Mr. President and Gentlemen: I think the subject has been very thoroughly discussed. I want to refer for a second to some of the letters that Dr. Fisher has just read. He quotes Dr. Graham of the Mayo Clinic. Dr. Cook a few minutes ago quoted Dr. Charles Mayo and Dr. Plummer, and they are at least favorably impressed with the diastolic pressure. Dr. Root was talking to me last night and stated that Sir Clifford Allbut has just come out with a work on circulatory diseases and that he supports what I have said in my paper in every particular with regard to the importance of the diastolic pressure, considering it the more important of the two. Personally I cannot see how Dr. Janeway can speak of a pulse pressure and a systolic pressure and lose sight of the importance of the diastolic pressure. It seems to me that it is a peculiar attitude, because in order to get the pulse pressure, he has to have the diastolic, and, as Dr. Rockwell has very clearly shown here, a rising diastolic is an indication of heart failure.

I would like to ask Dr. Muhlberg in regard to his statement about tying up the arteries. Did he mean that all the arteries except those of the splanchnic area were tied up? Were the arteries milked into the body before they were tied?

Dr. Muhlberg—No, the research that Dr. Porter and I published at the time showed that we tied up all of the arteries except the cerebral of course, and the splanchnic area, and then we bled the animal; as I recall it, the blood pressure

went down and promptly went up again, and then we injected saline solution and kept on injecting it until it represented more than the quantity of blood that that animal had in his body, and that pressure was not raised. The splanchnic area is a wonderful area. You can bleed a man to death without his losing a drop of blood simply by all the blood draining into the splanchnic area. On the other hand when that contracts it forces the blood into the general circulation and tremendously raises the blood pressure. You must remember that the splanchnic area, as the name would indicate, from the sympathetic ganglion in connection with that area is the area that is affected mostly by emotional causes. You will remember that there was some discussion some years ago with reference to splanchnic neurasthenia. When a man or woman faints it is simply because the splanchnic arteries relax, and the blood goes into the splanchnic area, anaemia of the brain results and fainting is a secondary result. The splanchnic area, in other words, is a tremendous reservoir that can hold all the blood in the body.

Dr. MacKenzie—It did not strike me that the argument was an argument against the value of hypertension and that was the reason why I asked Dr. Muhlberg the question. Now I might say that, as our letter shows, we have been asking our examiners to take this reading both at the fourth and at the fifth phases, and we are trying to keep a record of that to show just what the difference is. We are also going to try to correlate the relationship between albuminuria and blood pressure, more particularly the diastolic.

As far as the contention of Dr. Muhlberg and Dr. Davis goes, about not requiring blood pressures where they have so many urinalyses, I think that either of the gentlemen would admit that you can have interstitial nephritis extending over a long time without any evidence in the urine as far as albumin and casts are concerned, but I doubt very much if you could have an interstitial nephritis without some evidences of it in the blood pressure because immediately you get a peripheral resistance. In fact you may get an increased

blood pressure in renal conditions that are only noticeable microscopically.

I am unable to say anything about the urea or the specific gravity. We have not worked that out, but we are going to try to do it.

Dr. Porter—Thank you very much, Dr. MacKenzie. Dr. Cook made a very valuable suggestion that I would like to have put in the form of a motion that may be acted upon before we adjourn, bearing upon the continuance of the work of the Committee on Blood Pressure, with reference to the diastolic.

Dr. Cook—I move that a committee be appointed by the Chair to continue the investigation of blood pressure and to report at the next meeting, with particular reference to diastolic pressure.

The motion was seconded by Dr. Symonds and carried.

Dr. Cook—I would like to move you, Mr. Chairman, that it be understood to be the sense of the Association that we feel deeply grateful for the exceptional skill and tact with which our chairman has conducted the office of President, and that we desire to express our recognition of the genial and graceful manner in which he has acted as our host both in his official capacity as toastmaster at the annual banquet, and in his personal capacity at the Bankers' Club.

The motion was seconded and carried by a rising vote.

Dr. Cook—I would like to move you, Mr. Chairman, that the Association express through the Secretary its most sincere thanks to the officers and directors of the Mutual Life Insurance Company for their courtesy in extending to us the freedom of their Home Office for our meeting and for their bountiful hospitality which has added so materially to our comfort and enjoyment.

Motion seconded and carried.

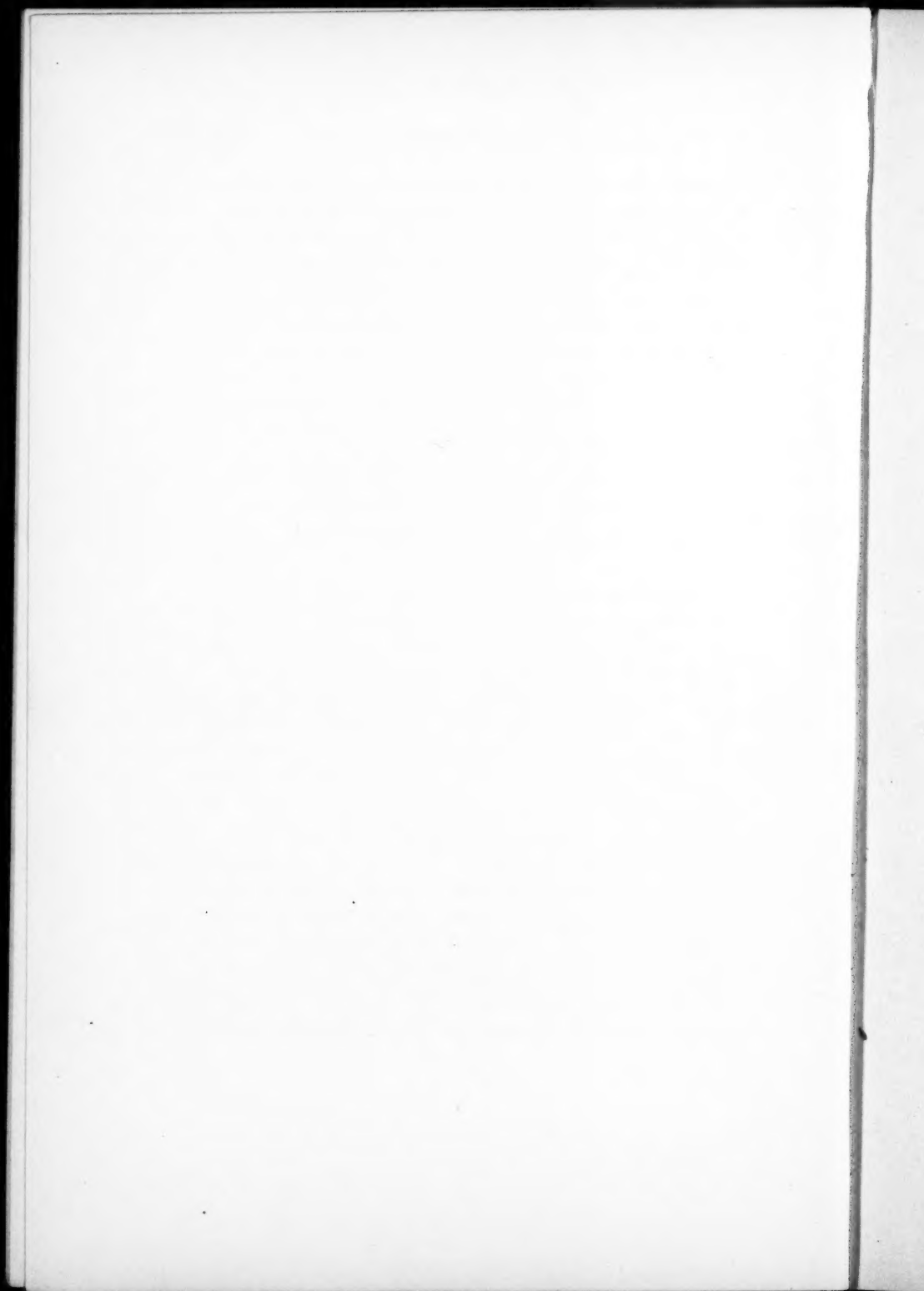
Dr. Porter—Before we adjourn I wish to express my sincere appreciation of the hearty coöperation which every one of you has given in our activities at this meeting. The response has been most gratifying. Without it of course the meeting could never have been a success, and rather than the credit being due to me I feel that it is due to your very hearty and cordial support, and I thank you all.

On motion the meeting adjourned *sine die*.

The Annual Dinner of the Association was held on the evening of October 14th at the Hotel Martinique. The following members were present at the dinner:

Drs. Henry A. Baker, W. W. Beckett, David N. Blakely, Laurence D. Chapin, Charles L. Christier-nin, Henry Colt, Henry Wireman Cook, John N. Coolidge, R. M. Daley, H. K. Dillard, C. R. Dudley, E. W. Dwight, Olin M. Eakins, Z. Taylor Emery, John W. Fisher, Paul Fitzgerald, Homer Gage, F. L. Grosvenor, George C. Hall, J. B. Hall, Angier B. Hobbs, W. G. Hutchinson, W. A. Jaquith, William W. Knight, R. L. Lounsberry, C. B. McCulloch, L. F. MacKenzie, William S. Manners, J. C. Medd, William D. Morgan, W. Muhlberg, John P. Munn, R. B. Ober, J. Bergen Ogden, Herbert Old, S. H. Parker, J. Allen Patton, John S. Phelps, Wm. Evelyn Porter, A. T. Post, T. H. Rockwell, Oscar H. Rogers, Edward K. Root, W. Walter Rose, R. L. Rowley, Eugene F. Russell, H. H. Schroeder, Howard B. Speer, Brandreth Symonds, Paul E. Tiemann, Harry

Toulmin, Henry G. Tuttle, Clinton D. W. Van Dyck, G. A. Van Wagenen, Wm. R. Ward, Joseph H. Webb, Wm. H. E. Wehner, Faneuil S. Weisse, Franklin C. Wells, F. L. Wells, Charles D. Wheeler, C. F. S. Whitney, George Wilkins, Thomas H. Willard, Gordon Wilson, McLeod C. Wilson, Glenn Wood, and A. B. Wright.



An Abstract of the Proceedings  
OF THE  
Association of  
Life Insurance Medical Directors  
of America.

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TWENTY-SEVENTH ANNUAL MEETING.

The Twenty-seventh Annual Meeting of the Association of Life Insurance Medical Directors was held in the Board Room of the Equitable Life Assurance Society, Number 120 Broadway, New York City, on October 25th and 26th, 1916. President Franklin C. Wells in the chair.

Roll-call showed thirty-four members present, constituting a quorum.

The following members were present at some time during the sessions:—

Charles D. Alton, W. W. Beckett, Charles D. Bennett, Thomas W. Bickerton, A. W. Billings, David N. Blakely, Laurence D. Chapin, Charles L. Christiernin, Henry Colt, John N. Coolidge, Thomas

C. Craig, R. M. Daley, E. W. Dwight, Olin M. Eakins, Z. Taylor Emery, John W. Fisher, Paul Fitzgerald, Homer Gage, F. L. Grosvenor, George C. Hall, W. F. Hamilton, Calvin L. Harrison, Angier B. Hobbs, William G. Hutchinson, W. A. Jaquith, A. J. Johnson, Morris L. King, William W. Knight, A. W. McClave, C. B. McCulloch, T. F. McMahon, Charles F. Martin, John C. Medd, F. D. Merchant, Lewis F. Mackenzie, Henry A. Martelle, Ralph B. Ober, J. B. Ogden, J. Allen Patton, W. O. Pauli, John S. Phelps, William Evelyn Porter, Spotswood H. Parker, Albert T. Post, T. H. Rockwell, Oscar H. Rogers, W. Walter Rose, R. L. Rowley, Eugene F. Russell, Howard B. Speer, Brandreth Symonds, Paul E. Tiemann, Harry Toulmin, G. A. Van Wagenen, William R. Ward, Wm. Perry Watson, Joseph H. Webb, William H. Wehner, Faneuil S. Weisse, Frank Wells, Franklin C. Wells, Charles D. Wheeler, C. F. S. Whitney, Thomas H. Willard, C. H. Willits, McLeod C. Wilson, Harry P. Woley, Glenn Wood, A. B. Wright.

The total attendance at all sessions was seventy-three.

Dr. Wells—It gives me great pleasure, at this point in our proceedings, to introduce to you one who is, and who has always been, a good friend of the Medical Director—appreciating and sympathizing with him in his problems, as well as being interested in the larger spirit of service to the public and to the policyholders, in the conservation of health, which the Life Insurance world is to-day so largely exemplifying, and I therefore take great pleasure in presenting to you the President of the Equitable Life Assurance Society, Judge



William A. Day, who has come to say a few words of welcome to you.

Judge Day—Mr. Chairman and Gentlemen of the Association, it affords me great pleasure to welcome you to our Home Office, and I thank you for the honor you do the Equitable in accepting the use of our quarters as a meeting place. That is the justification for my appearing before you this morning. Otherwise, I would have no standing here, unless perhaps you permit an outsider to come in. I would be then, so to speak, but a "looker-on in Vienna." Being here, however, the opportunity is afforded me of expressing to you my respect and esteem for your honorable and most useful profession. I look upon the Medical Departments of Life Insurance Companies as one, at least, of the corner stones, or bulwarks, of safety in life insurance. Upon sound actuarial methods and advice, and sound medical judgment in the selection of those whom we would insure, depends our salvation.

Shortly after I was elected President of this Company, I sent for our Medical Directors and I told them that thereafter no appeal would lie from their decisions in rejecting a risk. Similarly, I told our agents that I would entertain no appeal from the action of the Medical Department on rejected cases. I was not competent to pass upon these questions. The Medical Department was created for that purpose. I also instructed all those in authority in the Society to the same effect. During the first year after I made that announcement, a few appeals were made to me and to other officers of the Society, but they were sporadic instances, and few in number.

I deem it absolutely vital to the soundness of a life insurance company that the Medical Department shall be independent of administrative pressure in those particulars. If a medical department is not competent to pass upon those questions, then we would need a new medical department, or new men to administer it; but as long as I am President, I shall abide in those questions by the judgment of those who ought to know, and who I believe are competent to judge.

I have had the pleasure of reading over your program, and it appears to me to be a most instructive one, and will prove of value to standard life insurance companies. I notice with a very great deal of interest, the subject that you have assigned to our own Dr. Rockwell. Of all the subjects named on the program, it seems to me that is the most interesting one—"The Selection of Women." I also think it perhaps the most difficult one to successfully treat of, and more difficult than that will be to impart the secret to others. From the beginning of time, down to the present, that subject has occupied the attention and a great deal of the action of men, and looking back, speaking not from experience but from observation, my life extends back into the middle of the nineteenth century, and I do not see, judging from the opportunity I have had of observing others' experience in this respect, that the men of the twentieth century in their selection have improved over those of the nineteenth. The only man that I have heard of, who was perfect in his selection, was our progenitor, Adam. He, however, created his selection; but that is a lost art. It may be that Dr. Rockwell has rediscovered it, and he will impart to you the secret. Of course there are exceptions to all rules, and some men know a great deal more than others, and have been vastly more successful in their selection than others. Dr. Rockwell, fortunately, is in that class. I have had the great pleasure of meeting Mrs. Rockwell, who is a charming and admirable lady, as those of you who met her must bear witness, and she vindicates in herself the qualifications of Dr. Rockwell to speak to you on "The Selection of Women."

I trust your deliberations and conference will be harmonious and happy, and as fruitful as I have anticipated, and I thank you for giving me this opportunity of meeting you.

The Secretary then presented the names of the following candidates recommended for membership by the Executive Council:

Dr. Frederick G. Brathwaite, Associate Medical Director, Equitable Life Assurance Society.

Dr. William G. Nash, Medical Supervisor, Prudential Insurance Company of America.

Dr. Joseph E. Pollard, Medical Supervisor, Prudential Insurance Company of America.

Dr. Chester T. Brown, Medical Supervisor, Prudential Insurance Company of America.

Dr. George E. Kanouse, Medical Supervisor, Prudential Insurance Company of America.

Dr. William P. Lamb, Medical Supervisor, Prudential Insurance Company of America.

Dr. William Armstrong, Assistant Medical Adviser, Connecticut General Life Insurance Company.

Dr. John L. Adams, Medical Supervisor, Metropolitan Life Insurance Company.

Dr. Robert A. Fraser, Medical Supervisor, New York Life Insurance Company.

Dr. William Thorndike, Assistant Medical Director, Northwestern Mutual Life Insurance Company.

Dr. D. E. W. Wendstrand, Assistant Medical Director, Northwestern Mutual Life Insurance Company.

Motion was made and carried that the Secretary be instructed to cast one ballot for the election of these new members.

Ballot was cast as ordered, and candidates declared elected.

Motion was made and carried that the reading of the minutes of the last meeting of the Association be omitted.

The Secretary read the minutes of the meetings

of the Executive Council held on October 15, 1915, May 16, 1916, and October 24, 1916. These minutes were approved as read.

Dr. Rogers then introduced two of the newly elected members, Dr. Frederick G. Brathwaite and Dr. Robert A. Fraser, who were greeted with applause.

The balloting for nomination of officers was next in order, and Dr. Willitts and Dr. Wright were appointed tellers and distributed the ballots.

The Treasurer's report was read by Dr. Weisse in the absence of Dr. Knight. Drs. Toulmin and Wood were appointed as an Auditing Committee.

Dr. Rogers then presented the report of the M. I. B. Committee. It was moved and carried that this report be accepted with thanks.

The following report of the Committee on Blood Pressure was presented by Dr. Fisher:

Dr. Fisher—Mr. President and Gentlemen:

I believe that I was appointed chairman of this committee with a view of investigating the value of the diastolic blood pressure in examinations of applicants for life insurance. I do not believe that either of the other members—Dr. Fitzgerald or Dr. Cook—is present at this meeting.

We have not definitely decided, in our committee, as to the specific features of the diastolic pressure upon which to base our investigation. I can report that the Northwestern is recording the diastolic pressure on all applications received from cities of 100,000 or over in population, in which the company is doing business. We do this with a view of securing the most accurate readings and possibly the best results. We are recording, on a special card, all records in which there is any marked variation from the normal, and can therefore only

report progress so far as the Diastolic Pressure Committee is concerned.

I have only to report on the systolic pressure that the Northwestern has had 57 additional deaths since my last report of one year ago, ages 40 to 60, and 9 additional deaths under age 40, a total of 66 additional deaths.

I do not believe it is advisable for the committee to continue any further work on the systolic pressure of those of 40 years of age and over, as the reports of your committee demonstrate the value of the systolic pressure at ages 40 and over. It is our intention, at some future time, to determine the mortality on those declined by the company under age 40.

You will recall, in our last report, that the mortality of the Northwestern on some 465 cases, ages 16 to 39, by the M. A. table, was 147 %, and as there have been nine additional deaths, it will increase the mortality considerably, but the mortality has not as yet been computed.

I should like, when this report is discussed, to have suggestions from the members of the Association, as to along just what lines the investigation should proceed in regard to the diastolic pressure.

Dr. Wells—The discussion of this report will come up tomorrow morning in regular order.

It was moved and carried that the report of the Committee be accepted and the Committee be continued, with the thanks of the Association.

Dr. Wells—At the last meeting of the Association a Committee was appointed to study and report on Urinary Nomenclature. I will call for a report of that Committee at this time.

Dr. Robert M. Daley presented the following report of the Committee on Nomenclature of Urine Impairments.

REPORT OF THE COMMITTEE ON NOMEN-  
CLATURE OF URINE IMPAIRMENTS.

June 22, 1916.

As a result of the deliberations of this Committee, the following recommendations are presented to the Association of Life Insurance Medical Directors for their consideration:

COLOR—ODOR—REACTION

It is agreed that the nomenclature as to color, odor, and reaction of urine, is not of sufficient value, from a viewpoint of technical differences, to require the attention of the Committee.

SPECIFIC GRAVITY

It is recommended that the word "normal" as relating to the Specific Gravity of the urine shall refer to urine whose weight is between the limits of 1015 and 1025, inclusive; that the term "persistent high specific gravity" shall refer to urine whose specific gravity is over 1030; and that the term "persistent low specific gravity" shall refer to urine whose specific gravity is under 1012. Urines of a specific gravity 1012, 1013, or 1014 may be described as somewhat lower than normal; urines of specific gravity 1026, 1027, 1028, or 1029, as somewhat higher than normal.

It is recommended that the methods of examination of urine for albumin and sugar, as approved by the Association of Life Insurance Medical Directors in 1908, be considered as standard tests for these substances.

ALBUMIN

*Very Faint Trace*

*By Heat and Acid Test.* That amount of albumin which will produce a very faint transparent cloud seen only by inter-



## Nomenclature of Urine Impairments 289

posing a dark background obliquely between the source of light and the test-tube.

*By Nitric Acid Contact Test.* That amount of albumin which will produce a reaction only faintly visible as a haze or cloud by the use of a dark background when the urine has been in contact with cold nitric acid for a period of at least five minutes by the underlying method and up to twenty minutes by the overlying method.

### *Faint Trace*

*By Heat and Acid Test.* That amount of albumin which will produce a faint cloud which is transparent and flocculent only upon the addition of a slight excess of the acid. This cloud is best seen by the use of a dark background.

*By Nitric Acid Contact Test.* That amount of albumin produced in the manner described above which will produce a clean-cut ring of least visibility, best seen by use of a dark background.

### *Trace*

*By Heat and Acid Test.* That amount of albumin which will produce a translucent cloud or coagulum and which is more or less flocculent, depending upon the number of drops of acid used in the test.

*By Nitric Acid Contact Test.* That amount of albumin produced in the manner described above, whose ring is distinct and wider than that described as a "faint trace" (about  $\frac{1}{8}$  of an inch) and which can be seen through the top of the tube as a translucent zone.

### *Moderate Quantity or Amount*

*By Heat and Acid Test.* That amount of albumin which will produce an opaque cloud or coagulum, usually flocculent, yet made more so by the addition of a slight excess of acid.

*By Nitric Acid Contact Test.* That amount of albumin produced in the manner above described, whose ring shall be

of distinct width (approximately  $\frac{1}{8}$  inch in thickness) and which can be seen through the top of the tube as an opaque zone, and flocculent in appearance.

*Large Quantity or Amount*

*By Heat and Acid Test.* That amount of albumin which will produce a very dense coagulum, which in exceptional cases may become solidified upon continued boiling. The coagulum is usually flocculent in appearance even without any excess of acetic or nitric acid.

*By Nitric Acid Contact Test.* That amount of albumin produced in the manner described above, whose ring is usually more than  $\frac{1}{8}$  inch in thickness and whose zone is opaque, when viewed through the top of the tube.

SUGAR

*Faint Trace*

That amount of sugar that will reduce 5 cc. of the diluted Fehling's as described in the approved test when more than 15 drops of urine are required to reduce the Fehling's Solution or when equal volumes of urine and the diluted Fehling's are used that will produce a faint deposit of the suboxid of copper in the bottom of the test-tube after the test has stood for some time ( $\frac{1}{2}$ -2 hours). This is equivalent to less than  $\frac{1}{2}\%$  by the titration method.

*Trace*

That amount of sugar that will reduce 5 cc. of the diluted Fehling's as described in the approved test when 11-15 drops of urine are required to reduce the Fehling's Solution or when equal volumes of urine and the diluted Fehling's are used that will produce a precipitate of the suboxid of copper which makes its appearance in from five minutes to one half hour. This is equivalent to about  $\frac{1}{2}\%$  by the titration method.



## Nomenclature of Urine Impairments 291

### *Moderate Amount or Quantity*

That amount of sugar that will reduce 5 cc. of the diluted Fehling's as described in the approved test when 6-10 drops of urine are required to reduce the Fehling's Solution or when equal volumes of urine and the diluted Fehling's are used that will produce a precipitate of the suboxid of copper appearing in from one to five minutes' time. This is equivalent to about 1% by the titration method.

### *Large Amount or Quantity*

That amount of sugar that will reduce 5 cc. of the diluted Fehling's as described in the approved test when 1-5 drops of urine are used or when equal volumes of urine and the diluted Fehling's are used that will produce a precipitate of the suboxid of copper within one minute's time. Usually this reaction is almost instantaneous. This is equivalent to over 1% by the titration method.

### *Microscopical*

The sediment of about 15 cc. of urine centrifuged for 3-5 minutes at a rate of 1500-2000 revolutions per minute or about 30 cc. sedimented by gravity at least 12 hours shall be considered satisfactory.

### *Casts*

The sediment of urine as above obtained shall be used as a basis of calculation. The following terms shall convey the number present in one slide:

Rare.....	1-2
Occasional.....	3-6
Few.....	7-10
Numerous.....	More than the above

### *Red Blood Cells, Leucocytes, Epithelial Cells, Crystals*

The sediment of urine as above obtained shall be used as a basis of calculation. The following terms shall convey the number present in one slide:

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Rare.....	5-10
Occasional.....	11-20
Few.....	21-30
Numerous.....	More than the above

*Committee:* Dr. R. M. DALEY, *Chairman.*  
Dr. J. B. OGDEN.  
Dr. E. W. DWIGHT.  
Dr. A. B. HOBBS.  
Dr. J. A. PATTON.

Dr. Wells—This is a very interesting report, and as you can see from the reading of it, one which will give rise possibly to some new ideas and call for discussion. The discussion of this report will be deferred until later in the session, when we will take it up for such discussion as may seem wise and best. This will come properly after the reading of the papers on urine. It is in order now to receive the report and delay the discussion until later.

The report was therefore received as read, and discussion postponed.

The Secretary then read the following communication from Mr. Wendell M. Strong, Secretary of the Actuarial Society of America:

34 Nassau Street,  
NEW YORK, June 14, 1916.

DR. F. S. WEISSE, *Secretary,*  
The Association of Life Insurance Medical Directors.  
New York City, N. Y.

MY DEAR DR. WEISSE:

I take pleasure in formally notifying you of the Resolution of Thanks to the Committee in charge of the Medico-Actuarial Investigation which was unanimously adopted at the May meeting of the Society. The resolution reads as follows:

## Thanks from the Actuarial Society 293

"That the most sincere thanks of the Actuarial Society of America be tendered to the following members of this Society and of the Medical Directors' Association, who have constituted the Committee in charge of the Medico-Actuarial Investigation: Messrs. John K. Gore, Arthur Hunter, E. E. Rhodes, and A. A. Welch; and Doctors E. W. Dwight, O. H. Rogers, Brandreth Symonds, and Thomas H. Willard. By their extremely arduous labors over a period of five years, these gentlemen have advanced to a much higher degree than ever previously attained the science and practice of medical selection, and have placed the entire life assurance profession, not merely on this continent but throughout the world, under a great and lasting obligation by reason of the invaluable statistics obtained and classified by them."

"That a copy of this resolution be forwarded to the Medical Directors' Association."

I have notified the individual members of the Committee of this resolution.

Yours very truly,

(Signed) WENDELL M. STRONG,

*Secretary.*

Dr. Wells—You have heard this communication from the Secretary of the Actuarial Society. A reciprocal motion would be in order at this time.

Dr. Frank Wells moved that it be left to the President and the Secretary to adopt resolutions reciprocal of the honor which has been conferred upon the Medical Directors' Association by the Actuarial Society.

Motion was seconded and carried.

Dr. Willard—While we have a minute's time, ought we not to make an official acknowledgment of our indebtedness to

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two of our officers who serve year in and year out in a very efficient way that we sometimes perhaps lose sight of? It seems to me that the Secretary and the Treasurer of this organization do an immense amount of work that they do not get credit for, and that it would be an eminently fitting and proper entry on the minutes to record our thanks and obligation to them. We have had evidence this morning of the clearness and conciseness with which some important work done in the Council has been recorded and put before the general Association, and it is only one evidence of the many similar bits of work that have been done by that very efficient Secretary of ours. The Treasurer is not quite so much in evidence, and he himself is not here at all, because he is doing part of his work out in a western State, but his work has been accurately and satisfactorily done for a great many years. Therefore, I move that the thanks of the Association be at this time tendered to the Secretary and the Treasurer of this Association for the very efficient work they have done in the past and which we know they will continue to do, we hope, for a long time to come.

Motion was seconded and carried.

Dr. Fisher—Mr. President and Gentlemen: I desire to call the attention of the Association to the apparent increase of deaths of insured risks from angina pectoris, as is shown by the records of the Northwestern. During the years 1906-1910, there were 203 deaths from angina pectoris, out of a total of 11,265 from all causes, or 1.08% ; and for the years 1911-1915, there were 409 deaths due to angina pectoris, out of a total of 14,098 deaths from all causes, or 2.9%. For the present year, up to October 18th, there were 91 deaths from angina pectoris, out of 2,659 deaths from all causes, or 3.4% of all deaths. Two of the 91 cases were insured this year for large amounts. One was on the books of the company three months and the other six weeks. Sixty-one of the 91 deaths occurring during the present year from angina pectoris oc-

curred during the first ten years, with an average of 8.8 years of exposure, and the total average years insured, of the 91 deaths, was  $18\frac{1}{2}$ , with an average age at entry of 41.7 years and an average age at death of 60.2 years.

It would be of interest to know whether a like increase from this disease is shown in other companies of the Association. It would also be of interest to have an expression from the members of the Association as to the possible elimination of these cases where subjective symptoms are denied or withheld in the application for insurance. It is quite well established that in the case referred to, where death occurred within six weeks subsequent to the approval of the application, the deceased suffered from specific disease three years prior to the date of his examination for insurance. This disease was denied in his application. A reporting agency gave the case a clean bill and a special investigation, made by a home office representative, also failed to discover any history of this trouble. A double examination was made, in accordance with the rules of the company. The blood pressure, systolic, was 130 mms.; diastolic 84 mms. A postmortem examination revealed arteriosclerosis of the coronary arteries. On the date of death, the deceased was on the golf links, was taken with what was supposed to be an attack of acute indigestion, and died within a few minutes.

The other large case referred to was on the books of the company for three months, was examined by the same examiners, and resided in the same locality. Special reports were favorable, and the deceased attended to his regular duties up to an hour of his sudden death.

The blood pressure in this case was: systolic 144 mms.; diastolic not recorded.

Dr. Frank Wells—Were you certain of your examiner in the first case?

Dr. Fisher—Strange to say, both of these cases required two medical examinations, and they were both made by old and tried examiners and both cases were in the same town and examinations made by the same examiners.

Dr. Rogers—I should like to ask Dr. Fisher if those two examinations were made at the same time or at a different hour.

Dr. Fisher—That I cannot say.

Dr. Rogers—The reason I raise the point is, that during the last year or two, the New York Life has made it a practice to have its medical examinations made at least six hours apart, for large amounts; and in the case that Dr. Fisher mentions, one point I notice is that the pulse pressure is a little high. I think there are 46 mms. between the systolic and the diastolic. This seems a little high. I am inclined to think if we get as high as 45 mms. we are rather on thin ice, and it may be that that would be suggestive. I doubt very much that the pulse pressure should be above 35 mms., and where you are dealing with large amounts, I think that is worth looking into a little. Those are the only points that occur to me, Dr. Fisher, in connection with those cases. They are very interesting. We are all getting them, and we all feel, as Dr. Fisher evidently feels, very much chagrined, that we should lose a risk that we have carefully studied so long after we have made the study.

Dr. Fisher—This was in a town of over one hundred thousand and the examiners were first-class men. Both deaths occurred this year, and both cases were examined by the same examiners.

Dr. Ogden—Was the second case confirmed by autopsy as well?

Dr. Fisher—That I do not recall.

Dr. Van Wagenen—I think perhaps Dr. Fisher may be interested in the history of Dr. Holden's case, whom all of the older members of the Association will remember very well. Dr. Holden died of angina pectoris. He had a very severe attack in the office, his first attack, about five years before he died. I remember that attack very well, because I was sitting in the next room when he called. I went directly into his room, and he was lying on a lounge, and had taken his collar in his two hands and had ripped his shirt open. His



face was very red, and he soon became pale, and afterwards went into a cold sweat. He cried: "I am dying, dying!"—and almost immediately he had no pulse. His feet were ice-cold. That was the very first indication that he had. I speak of it because it shows how very pronounced that first attack was. The Doctor lived about five or six years after that, and though Young and I very frequently examined his heart, I want to say that I think only on one occasion could we detect the least bit of trouble. The action of that heart seemed to be perfectly normal, as far as you could judge by a very careful examination of it, and he asked us at different times to listen to his heart. Once we thought we detected a very slight murmur, but it did not persist, and there were periods when Dr. Holden appeared to be just as well as ever. He had during the five or six years that he lived, after that first attack, very slight attacks indeed, and as he was very nervous, he was a good deal demoralized by them, but I speak of it for the reason that we had five or six years in which to watch him carefully, and the examinations were made by two men, one of whom at least—Dr. Young—was very careful, and I tried to do my best.

Dr. Rogers—You did not take his blood pressure?

Dr. Van Wagenen—No, we did not at that time take the blood pressure—it was about eight years ago. I do not know what the blood pressure was, but as far as the character of the pulse goes, there appeared to be nothing. I mention it to show that in these cases perhaps only the man himself could give the history, but you could not detect it by careful physical examination. Dr. Holden's attacks came a little more frequently, until finally, on the night of his death, he said to his wife: "I have passed a day which has been unusually pleasant for me. I have had practically no trouble at all. I feel better than I have felt for a long time." And Mrs. Holden told me that after they had retired they were talking for a few minutes about some matters in the family, and then he turned to her and said: "Well, good-night, I think I will have just as comfortable a sleep as I have had a comfortable

day." About a minute or two after that, there was something she wanted to say to him. She spoke, and he did not answer. She thought, "he has fallen asleep." She repeated the question, there was no answer; she put her hand out and touched him, there was no response,—and he was dead. I do not believe that the most careful examiners can detect those cases.

Dr. Fisher—We have been very careful in these cases where there is a history of acute indigestion. How many proofs of claims you get where they state the cause of death was acute indigestion, and I imagine ninety-nine out of one hundred of those cases are angina pectoris. Now, in this first case, the man was on the books only six weeks. They claim that he suffered from an attack of acute indigestion, just as he did on the golf links, about a week before he died. In the second case, the man had been in a conference—he was connected with a large manufacturing concern, and had been in conference for about seven or eight hours that day, and they had raised his salary from \$5000 to \$7500. He left the conference and went into his own office, and he told his clerk that he was a little tired and he thought he would go home. He went home and was not there five minutes until he dropped dead from angina pectoris, so that I think we ought to be very careful in those cases where they give a history of attacks of acute indigestion. My predecessor died of angina pectoris, and he suffered from attacks for at least ten years and always attributed them to acute indigestion, and I have a relative who has suffered from angina pectoris for the last fifteen years, but he has a well-marked mitral regurgitant murmur of the heart and has had it for many years, but he will have these attacks and he has always thought they were due to acute indigestion.

Dr. Ward (?)—I should like to ask Dr. Fisher if the apparent increase of percentage in these angina deaths could be possibly attributable to the increased scrutiny he gives the diagnosis, as he says.

Dr. Fisher—That may possibly be the cause. I give the cause of death angina pectoris a great many times when it is



not so recorded on the blank. I usually correspond with the doctor and endeavor to draw out any symptoms the insured had prior to his death. I usually have good ground for giving the cause as angina pectoris. That was one thing I tried to draw out here, whether any of the gentlemen had noticed an increase in their deaths from angina during the past few years.

Dr. Wells—It is a very interesting question, and if any of the members of the Association can furnish Dr. Fisher with the information which he seeks, I am sure it will be very valuable to us all. Of course when a heart is labeled with all the symptoms of failing compensation, failing circulation, it is easy to diagnose, but there are cases that are not so easy.

Dr. Fisher—Here is another point—last year, of the 92 deaths we had, the average age at entry was 42, but the average age at death was 60.4 years, and the average time on the books of the company was 18.3 years.

The tellers announced the result of the ballot for the nomination of officers, as follows:

PRESIDENT

DR. HOMER GAGE  
DR. W. A. JAQUITH

FIRST VICE-PRESIDENT

DR. W. A. JAQUITH  
DR. E. W. DWIGHT

SECOND VICE-PRESIDENT

DR. A. B. WRIGHT  
DR. W. R. WARD  
DR. T. H. ROCKWELL  
DR. C. H. WILLITTS  
DR. G. A. VAN WAGENEN  
DR. W. W. BECKETT

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SECRETARY

DR. F. S. WEISSE  
DR. C. F. S. WHITNEY

TREASURER

DR. A. S. KNIGHT

EXECUTIVE COUNCIL

DR. E. W. DWIGHT  
DR. G. A. VAN WAGENEN  
DR. C. F. S. WHITNEY  
DR. T. H. ROCKWELL  
DR. A. B. WRIGHT

Dr. E. W. Dwight asked the privilege of withdrawing his name as candidate for First Vice-President. Dr. W. A. Jaquith asked to have his name withdrawn as President. Dr. C. F. S. Whitney asked to have his name withdrawn as Secretary, and Dr. A. B. Wright asked to have his name withdrawn from the Executive Council.

Dr. Gage then took the chair during the reading of the President's Address, and Dr. Wells read the following address, entitled:

## PRESIDENT'S ADDRESS

THE MEDICAL DEPARTMENT—ITS FUNCTION  
AND SCOPE

By FRANKLIN C. WELLS, M.D.,

*Medical Director of The Equitable Life Assurance Society of the United States;  
President of The Association of Life Insurance Medical Directors  
of America.*

In opening to-day the Twenty-Seventh Annual Meeting of the Association of Life Insurance Medical Directors of America, it gives me great pleasure to welcome you to the home of the Equitable Life Assurance Society.

On December 6th of this present year, this Association will have completed twenty-seven years of its history, a history that seems to be growing more interesting and more important with each succeeding year. Organized as it was for the safeguarding and upbuilding of the life insurance business, with which it is so inseparably connected, it has ever since faithfully endeavored to live up to its aim and purpose. Not the least of the fruits of these years of organized effort has been the creating and maintaining of a spirit of harmony among the Medical Departments of the companies represented in its membership, all of which has naturally resulted in greater coöperation and effectiveness. Not alone have the results been confined to greater efficiency of operation, but they have gone out and beyond this, to the selection of new business, and to a more scientific classification of the old, and in doing this the Association has done much to formulate a standard of acceptability, consonant with safety.

Also, in conjunction with the Actuarial Society of America, it has given to the life insurance world, a compilation of mortality experience, which is of immeasurable importance and usefulness.

The annual meetings have been maintained and liberally supported by contributions of original research and experience from the members thereof, and they have been, not only full of

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interest, but have furnished to the literature of medical insurance work a fund of material whose worth is impossible of estimation.

The Medical Department of a life insurance company is primarily a department of selection, and as such engages in some of the most difficult problems that can arise in the business of which it is an integral part.

The kind of material for structure may be as varied as the persons who are engaged in its selection, but it is a fundamental principle, and one perpetually in evidence, that whatever kind of material be selected or used in a structure, it shall be safe, dependable, and good.

This is the principle that a Medical Department must grasp, and it is in the analyzing and sorting out the good from the doubtful and the bad, that it finds itself confronted with many perplexing problems.

A correct estimate of the value of a department of selection to a company involves many considerations, and the very fact that so much time and literature have been continually bestowed upon it is a tribute to its importance.

It has a place, which is not only distinct, in protecting and safeguarding mortality and stability, but it enters also into many of the relationships of the entire corporation.

It has well been stated that, "a Medical Director who confines his duties to merely looking over papers and appointing examiners does not earn his salary, if it is very large. His position is one of trust, requiring judgment, honesty, and unlimited diplomacy. A Medical Director who is not in himself a stimulant to the business of his own company is more or less a failure. He should be an active force in the official staff of the company."

In line with this, one of the first points of importance is that of contact with the

### AGENCY DEPARTMENT

This is vital and many-sided, and probably in no relation or situation will there be a demand for the exercise of greater

tact and coöperation. The Agency Department is the Department of Salesmanship, and selling the goods is the life-blood of the business. Policy forms may be devised, rates may be printed, but it is the sale of the contract on which all the various departments and the business itself depend. With this branch, therefore, there should be a spirit of the heartiest coöperation and helpfulness. To the Agent in the field, both the Medical Director and the Medical Examiner should be confidential advisers, assisting him in many ways, in the handling of business, and in the establishing of mutual confidence. The Doctor should have a correct estimate of the value of the Agent to the Society, and the Agent should learn to realize that while the Medical Department is charged with certain duties that may seem opposed to his interests, it is, after all, in perfect accord therewith.

Further consideration of this particular branch of the service would lead us far afield, but this reference is made to emphasize a point oftentimes dwelt upon too little.

Secondly, coming at once within the scope of the Medical Department is the subject of Mortality Savings, which, more than any other one factor, justifies the existence of Medical Selection and the Medical Department. Probably in no other feature does it come into closer contact or more vital relationship to the Actuarial Department than in the working out of savings from mortality alone, and which is a large source to the corporation, of profit and income.

In the relationship of these two departments, there should be the heartiest coöperation, the Actuary furnishing the sailing chart, indicating clearly sunken reef, hidden rock, and dangerous coast, and the Medical Director interpreting the sailing orders, and, by professional knowledge, piloting the ship, avoiding the dangerous places, points, and channels.

To illustrate the value of team work and coöperation, I quote from the opening page of Volume I of the Report of the Joint Committee on the Medico-Actuarial Investigation, where is set forth the following statement:

"In 1907 the Association of Life Insurance Medical

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Directors, following a discussion upon Medical Selection, appointed a Committee to formulate plans for a thorough study of the various types of supposed medical impairments, making use of the Specialized Mortality Investigation as a basis, and to some extent a model. This Committee submitted a preliminary report to the Association at its meeting in 1909 and was still at work upon the subject when, early in that year, the Actuarial Society of America appointed a Committee to extend the work of the Specialized Committee. The latter Committee, learning of the proposed investigation by the Medical Directors' Association, immediately approached the Committee of that body and suggested a joint investigation, since it was realized that a good deal more could be accomplished by united effort than by each Society separately. Accordingly, the two Committees went before their respective Societies with a plan of a coöperative nature or joint investigation, and in October, 1909, received full authority to proceed with the work as representing both the Medical Directors' Association and the Actuarial Society."

This is a clear statement of the relationship that should exist between the Medical and Actuarial Departments, and, indeed, furnishes a good example for the interrelationship possible and desirable throughout the entire organization, and it strongly emphasizes the fact that more can be accomplished by united effort than by each Department separately.

A third function of the Medical Department is the appointment and maintenance, throughout the various parts of its operating territory, of a careful and thoroughly trained staff of competent Medical Examiners. As the Doctor in the field is the selector of business, his comprehension of his duties should be clear and precisely understood. It is also the active duty of the Medical Department to see that he is in possession, not only of the requisite professional skill to competently make a physical examination, but that he possesses, and, still better, exercises, the requisite amount of tact and business acumen, which will make him not only a valuable asset to the Medical Director, but also of assistance and encouragement to the



Agent with whom he so often and so intimately comes into relationship.

The whole question of the Medical Examiner, his appointment, education, and value to the company which he represents, is a fertile subject for consideration. It is to be hoped that during this session of the Association some new information may be forthcoming in the discussions in regard to better methods for solving these problems as they come up within the wider scope of the Medical Department.

I would here like to recommend to the Association, that each member thereof personally lend his influence and support in every possible way to all movements that may secure better and more intelligent medical selection by the Doctor in the field. To this end, support and encouragement should be given to the various medical colleges in this land that embody in their curricula a course of instruction in medical life insurance work.

At present there are only twenty colleges in this country, of which I have been able to learn, which have such a course, and, in my opinion, it would not be improper or impractical for this Association to place itself on record as favoring heartily the further application of this principle of a preliminary medical insurance education, as a helpful and useful subject to undergraduates of medicine.

Reaching out and beyond the province of the mere selection of safe and sound risks, the Medical Department of a Life Insurance Company should constantly lend its aid and its influence to the study of causes of disease. There are abundant statistics which assist so largely; it is gratifying to recall that these have been most liberally furnished by members of this Association in the past, and more recently when a specific appeal has been made to the Life Insurance Companies, through the various Medical Departments, for assistance in the study of the subject of Cancer.

The American Society for the Control of Cancer, during the early part of this present year, organized a statistical advisory board consisting of delegates from appropriate agencies for

the purpose of considering and carrying out such lines of statistical research as might give promise to throw further light upon the problem of malignant disease. Among these agencies above referred to were the Life Insurance Companies, and their coöperation was sought in carrying on certain promising statistical investigations of this disease, as recorded in Life Insurance experience. Two types of cancer were suggested for specific study, those of the breast and tongue, and a sub-committee was appointed, I am pleased to announce, from members of companies represented in this Association, to elaborate a plan of coöperation to this most important end.

These two forms of cancer were selected as being of the external variety, and consequently least liable to serious errors in terminal diagnosis, and while the actual number of such cancers in Life Insurance experience is relatively small, the burden also of collecting such information would not be a matter of serious consideration.

Such work, such expenditure of time and thought, and even money, is certainly within the scope and province of the Medical Department, and practical assistance, I am sure, will be accorded this work, by this Association, the returns of which will be invaluable in bringing about a better understanding of the elementary facts of the cancer problem.

Another, and an important, subject coming within the scope of the Medical Department, and which I commend to you, is that of standardizing the Nomenclature of Causes of Death, so vital to the study of statistics, as well as mortality.

The importance of the study of the causes of death is so well recognized, that an international code of nomenclature has been devised to insure harmony and comparability between reports from different sources.

Harmony of reports is of especial importance to the Life Companies, since they often elaborate joint statistics which exceed in magnitude and value those of any individual company. But much should be done to increase this harmony in regard to reports of the causes of death.



We have an international code of the year 1900 with an abridged classification, an intermediate, and a detailed classification. (See page 19 of the 1902 Manual issued by the U. S. Census Office.) We also have the revised international classification of 1909. It is unfortunate that the international code of 1909 differs to a seemingly unnecessary degree from the international code of 1900 as regards the numerical designation of the causes of death. For instance, in the 1900 code phthisis is No. 27, in the 1909 code it is No. 28. Syphilis is 36 in the 1900 code, but 37 in the 1909 code. The diseases of the respiratory system range from 87 to 99 in the 1900 list, but from 86 to 98 in the 1909 list. The diseases of the digestive system range from 100 to 118 in the earlier, from 99 to 118 in the more recent classification. There are many more such differences, which I think could have been avoided by the omission of numbers, or the insertion of fractions, or the use of letters.

Now, the question arises, Do not some of the companies use the 1900 code and the others the 1909 code? Do not those who use the 1900 code, use the abridged, the intermediate, or the detailed list? Have some of the companies a classification of their own? Or do some of them still use the old Bellevue Hospital list of causes of death? Have some of them changed from the 1900 classification to the 1909 classification? The Equitable has for many years used the 1900 classification and still uses it, because it would mean a large amount of work and endless confusion to change from one classification to another.

Of course, it is of great importance that all companies classify their death causes according to the same code if we wish for a ready and useful comparability of records.

But the differences in the standard codes is not the only feature that detracts from the comparability of death-cause records. A feature that also gives much trouble is the deficient manner in which death certificates are often issued by the attending physician. The physician making out the death certificate apparently *will not* comply with the suggestions

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made by the Census Bureau. A few years ago the Census Bureau sent copies of the international code and suggestions as to its correct use to all the physicians in the United States and also to the Medical Colleges. Yet, almost every day, our Company receives death certificates naming as causes of death, "heart failure," "dropsy," "accident," etc.

In such instances, of course, we have to write for further information. Strange to relate, among all the answers to the many hundreds of these letters, there were so far only two that showed, on the part of the physician whom we addressed, a thorough knowledge as to the use of the international classification. Under the title "An Experiment in the Compilation of Mortality Statistics," Dr. Dublin and Mr. Kopf, of the Metropolitan, published an interesting article, showing under what condition the Metropolitan seeks further information from the physicians who make out the death certificates. No doubt, many companies write to the attending physician for further information as to many causes of death. But do the various companies, in writing for further information, follow a certain harmonious rule? I know of none.

In the work of classifying the causes of death, perhaps the greatest difficulty is occasioned by those death certificates—about 25% of the whole—in which two or more diseases are mentioned as the death cause. The 1902 Manual of the International Classification of Causes of Death makes certain suggestions which our Company has been following, and in doubtful cases of considerable general importance we have taken the trouble of writing to the Census Bureau to learn if our views agreed with theirs. But recently the Census Bureau gave us quite a jolt by its publication of an "Index of Joint Causes of Death." This Index is a cause of much trouble, as it seems to be, in many instances, out of harmony with the rules that we have been following. It is true, the "Introductory" states that it is "printed as proof" so that statistical workers may use and criticize the method of procedure. The "Introductory" also states that it has been "the practice of the Bureau of Census . . . to depend upon a list of individual

decisions, added to from time to time as new cases arose." The two letters which we received recently from the Census Bureau indicate that much work will have to be done to get the system of classifying joint causes into satisfactory shape. It surely would be a worthy object of this Association to take this apparently difficult subject in hand, and elaborate a uniform scheme of classification.

Steps looking toward a classification or standardization or urinary nomenclature were taken at our last annual meeting by the appointment of a special committee whose report we shall await with interest. In dealing with a subject of such vital importance to the Insurance world, as is that of urinalysis, a classification of the terms involved which are used should certainly be understood by all, and it is a matter of interest that this subject has at last been given the consideration that it merits, and one may hope that we shall discover and adopt a classification that will accurately and intelligently coordinate the various findings in the examination of the urine.

In line with the subject of classification and of standardization which certainly comes within the realm of the Medical Department is that of occupation, and the hazards incident thereto. Could a definite and uniform interpretation of what constitutes a "hazard" in occupation, and the degree thereof, be established, much unnecessary annoyance and loss of time would be obviated, and a remedy and relief would be given that would affect all concerned.

Before closing this paper, which contains only a few brief allusions to some of the subjects of vital importance, which come within the scope of the Medical Department, I cannot refrain from referring to the subject of the Conservation of Health, that wider vision of splendid service now opening before the Life Insurance world, and which so many of our companies are rendering. A Medical Department must keep abreast of the great movements, not only in surgery and medicine, but also in the study of the physiology of habits of life, public and industrial hygiene, and all other forms of the

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art of upbuilding of human health, and lessening of unnecessary mortality.

There is but one gauge or test of civilization that can apply to the commercial and industrial world, and that is the estimate which is put upon humanity, not according to money standards, but according to its manhood standards. It is one of the hopeful signs already dawning on the horizon of the century that the Life Insurance business and the entire industrial and commercial world seem to be placing a higher estimate upon the value of the human machine, that men are human, and that if they are better housed, cleaner, healthier, and happier, they will be more valuable to themselves, to their employers, and to the State.

In accordance with this point of view, the Life Insurance Companies of this land may well have a share, not only in placing within the reach of a portion of the twenty-five million or more policyholders, a practical means for determining their physical condition, by a periodical medical examination, but also in disseminating information and instruction of such a nature as concerns the fundamental principles of sanitation hygiene, and health.

The Auditors reported that they had gone over the books of the Treasurer, and found them correct for both last year and the year preceding. The Treasurer's Report was accepted with thanks.

Dr. Thomas H. Willard then read the following paper, entitled "Conservation Work and Life Insurance."

Dr. Willard—I could not have had a better introduction for my remarks than the conclusion of the remarks of the reader of the paper who preceded me, and I thank him for having made my work a lot easier, in introducing my subject.

## CONSERVATION WORK AND LIFE INSURANCE

BY THOMAS H. WILLARD, M.D.

*Medical Director, Metropolitan Life Insurance Company.*

The invitation to continue the presentation of the subject of "Conservation Work and Life Insurance," so ably treated by Dr. Wells last year, was accepted with great pleasure. The discussion which followed the delivery of his paper indicated that much interest had been aroused, and it is to be hoped that this interest may be increased. It was believed after conference with the President that the Association would be interested in the welfare work conducted by the Metropolitan Life Insurance Company among policyholders, the general public, and employees. Dr. Wells's arguments justifying the wisdom of the plan of periodic examinations of policyholders, which was adopted by his Company both from business and humanitarian standpoints, were unanswerable, but his figures showed, if I remember correctly, that only a small percentage of insured lives embraced the opportunity which was offered. It is possible that one reason for this lies in the fact that constantly increasing numbers of our people are accustomed, on their own initiative, to have periodic examinations made by their own medical advisers—a true preparedness against the ills of humanity which sooner or later come to the most of us. Some have not coöperated because, strange as it may seem, they have a suspicion that the Company offering such privileges must have something up its sleeve and must be trying to get the better of them.

The experience of the Metropolitan has been similar to that of the Equitable. Our method has been slightly different in that the reexaminations have been conducted by the physicians of the Life Extension Institute and not by the Company's examiners; but less than 10% of those entitled to the service have accepted it. With such results as this it is but natural that Life Insurance Companies, convinced of the duty of doing much more than merely conducting a successful and solvent



business, should seek to reach and influence larger numbers. Besides the work among policyholders, there should be the education of the general public in every way possible in matters of correct and careful living, protection against the outbreak of epidemics, and in many other directions which naturally suggest themselves. Insured lives are secured from those who up to the time of taking out a policy have not been insured. The success of great Life Insurance Companies and all great corporate activities depends upon the efficiency, well-being, and happiness of the Field and Home Office forces. That this truth has been recognized by large corporations and employers of labor there is abundant evidence, for at the present time there are very few which do not now conduct highly organized methods of providing for the welfare of their employees.

The Metropolitan has, therefore, beginning in 1909, conducted welfare work along three definite lines. Privileges have been given to policyholders tending to better their mode of living and protect them against disease, the general public has been educated by the circulation of very large numbers of circulars and pamphlets, and the entire organization of the Company has collaborated with local, State, and national officials charged with the care of the public health and with private welfare organizations having similar aims. The Field and Home Office staff have also been subjects of the Company's care and thought, and it has been suggested that a presentation of some of these methods may interest you and perhaps prove stimulating and suggestive.

#### *The Policyholder*

As has been indicated, we offer the periodic reëxamination of our policyholders in what we term our Ordinary Department, but, as we have said, the number who have experienced the benefits of these is very small. More should be done for the policyholder.

For the Industrial policyholder a nursing service has been established which is being constantly increased, and the time

is not far distant when any Industrial policyholder of the Company who needs the service of a nurse can secure it by notification to our field office. The record shows that since the establishment of the service 5,981,520 visits have been made up to July 31, 1916. The effectiveness of such a service can readily be appreciated, and numberless instances are at hand to show that the prompt aid which has been rendered has saved lives and decreased suffering. The instant recognition by a trained eye of the gravity of the situation and the securing of prompt medical or surgical aid in hospitals are obvious, but who can appreciate the effect of this constantly increasing work among large numbers of our population in the way of correcting living conditions and combating the effects of ignorance and improper ideas regarding clothing, food, habits, and the care of children? The educational influence for good of these helpful and sympathetic nurses has the effect of enlightening the ignorant, and by precept and example of enforcing correct ideas of cleanliness, sanitation, and correct living.

The Company was one of the early recruits in the world-wide war against tuberculosis, and its first pamphlet, whose circulation up to the end of 1915 has totaled over 5,700,000 copies, conveys information in simple terms to great masses of the people and it has fully justified itself. This pamphlet has been supplemented from time to time by others dealing with different aspects of the subject. Warnings against "Fake Consumption Cures" which delude the poor unfortunate into the belief that the disease can be cured by quack nostrums have been largely circulated, and a valuable pamphlet on "Directions for Living and Sleeping in the Open Air" has been of great benefit in numberless cases. "Lists of Sanatoria" in the United States have been circulated among policyholders and the general public, so that when the disease is recognized the nearest institution for treatment of it may be readily selected by the afflicted one.

As a means of communicating information and helpful suggestions to a body of policyholders which now numbers

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some 12,000,000, the quarterly magazine called *The Metropolitan* has been a most valuable medium. Its circulation is 5,000,000.

Infant mortality is one of the shames of our civilization and one of the most prominent facts in vital and life insurance statistics, and we have attempted to educate large numbers of people, most of whom stand in great need of such instruction, regarding the care and rearing of babies and children. An attractive pamphlet called "**The Child**" has been issued in enormous numbers and in various languages, giving in easily understood terms valuable advice as to the care and rearing of children. It has met with public favor as is evidenced by the fact that it has many times been requested for distribution by many welfare associations and by health authorities. Another pamphlet is "**First Aid in the Home**," which gives instruction how to meet common emergencies and accidents. "**The Health of the Worker**" gives valuable information for the care of the health of those engaged in industrial occupations particularly those detrimental to health, and in connection with this there have been many times conducted in various localities agitations for the protection of the lives and health of workmen by the use of such safety appliances as are available in various trades and callings. "**Teeth, Tonsils, and Adenoids**" is the title of another pamphlet giving general information on these important subjects. "**All About Milk**" seeks to acquaint the general public with all the facts regarding the production, distribution, and care of this most important food. Additional pamphlets whose editions run into large numbers have been prepared and circulated on the preventable and infectious and contagious diseases, and among the subjects embraced are typhoid fever, diphtheria, whooping cough, measles, etc., and many others. Small-pox, happily now comparatively infrequent, is made the subject of another pamphlet in which the absolute need for the continuance of the preventive measure of vaccination is strongly urged. These pamphlets have been prepared by authoritative experts and contain the last word as to our knowledge on the various



subjects. The general public has received attention on these plans in many ways. The pamphlets which we have referred to as circulated among our policyholders are many times given to the general public not only by our representatives but by the various health authorities and organizations engaged in welfare work.

The Company at its Home Office and its representatives in the field have coöperated with local, State, and national officials in many ways. Local clean-up campaigns, campaigns directed against the fly and mosquito have been largely aided by our representatives distributing pamphlets and creating public opinion on the subject, and in two instances valuable work has been done in collaboration with the United States Labor Bureau and the authorities of the City of New York.

Pamphlets on "Cancer" have been distributed in collaboration with the National Association for the Study and Control of Cancer.

In numberless ways which need not be mentioned here the officials of our Company, both at the Home Office and in the field, have been identified with movements of all kinds tending to improve the health and prosperity of the entire body politic. One of the latest of these is a participation in the experiment which is to be conducted by the National Association for the Prevention and Cure of Tuberculosis, in Framingham, Massachusetts, in which to conduct the experiment of locating every case of tuberculosis, treating the patients most carefully in the hope of curing them and endeavoring to prevent any one else in the community from being infected. This rather ambitious scheme will require much thought and the expenditure of large sums of money, and my Company has promised to spend \$100,000 on this experiment, the amount to be distributed in the next three years.

#### *Field and Home Office Forces*

As will be noted, not all of the plans and methods mentioned under this heading have to do literally with the conservation of

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life. Dr. Wells properly remarked in his paper: "To-day we are entering upon an era where the corporations and the industrial world are beginning to realize that efficiency in its truest sense must begin with the conservation of health and strength of the individual, and they are placing a higher estimate on the value of the human machine, realizing that man is greater than the mill, the producers more important than the product, and what injures the man injures the machinery."

Very many of the plans we have in operation for our Home Office employees are no doubt in some form or other present in most of the other large life insurance companies, as they are certainly present in most of the large industrial corporations.

An early stimulus to thrift and foresight was the establishment of the Staff Savings Fund. For every dollar deposited in this fund by the employees the Company deposited fifty cents, and the earnings of the combined fund were credited to the depositor. If death or misfortune retired the employee, the amount contributed by him, the earnings of the combined fund, and the contribution of the Company were paid; but if any other cause occasioned the retirement only the original contribution and the earnings of the combined fund were paid, but the Company's contribution was not withdrawn; it remained in the fund for the benefit of the persistent depositors. This fund now contains nearly three and one-half million dollars. A somewhat similar fund, though of smaller proportions, is known as the Vacation Fund, in which employees save during other times of the year for the extra expenses of the vacation time.

Provision is made for sickness and temporary or permanent disability by a policy insuring against both, one half of the premiums for which is paid by the Company, and a life insurance policy is added without charge.

A Coöperative Association for the purchase of all sorts of commodities such as food, clothing, etc., is in successful operation.

The entire Home Office force—official, clerical, and mechanical—is served with luncheon five days in the week.

There are the usual athletic associations whose existence is largely fostered by the Company. Suitable rest rooms and medical service are provided, and a dental clinic has been established which provides an examination and cleansing of the teeth twice a year and which arranges for the prompt and efficient attention to such conditions as can not be treated at the Home Office.

Then there are the usual educational and social organizations—glee clubs for men and women and a very large band recently instituted but already quite successful.

For the field and Home Office force a system of annual examinations has been in operation for a little more than a year and the experience so far has been very satisfactory.

As we said in the beginning, consumption was the one disease which naturally would first engage attention. Early in the progress of its work for the welfare of all its people the Company made plans for the treatment of all its tuberculous employees, and steps were taken for the erection of a sanatorium, and after the usual delays and difficulties attendant upon the selection of a site and the discussion of the various problems connected with the subject the sanatorium was erected on Mount McGregor, nine miles from Saratoga, where our employees from the field or Home Office are treated, and where, we are glad to say, the great majority of them are cured. In the beginning of the work a large number of advanced cases were taken, but now with our home and field office forces thorough'v examined every year the percentage of incipient cases entering the sanatorium is increasing and the number of advanced cases materially reduced. The statistics which will undoubtedly prove of interest to you will be found below.

This sanatorium was intended primarily to cure, if possible, and to arrest when cure was not possible, this dreadful disease when it was found among our employees, but it had another object, and that was to inaugurate such improvement of treatment and to solve administrative problems that the experience would be a stimulus to other companies and corporations to engage in a similar work.

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Some of you are familiar with the institution, having inspected it, but for those who are not, a most cordial invitation is extended and every member of this Association who finds himself a visitor at Mt. McGregor will be warmly welcomed by Dr. Horace J. Howk, the Superintendent.

The statistics regarding the extent of the Nursing Service and of the circulation of the pamphlets which we have referred to will also be found below.

It is perhaps pertinent to quote from the address of the President of this Association, which was delivered by the present speaker in 1909, in order that we may realize the progress which is being made in welfare work among all classes of the population and which it is to be hoped will increase as time goes on:

"At this time the whole civilized world is battling with one of the most potent and dreadful forms of disease. Knowledge is being obtained at a thousand different points which is collected, analyzed, restudied, and already to an appreciable extent the ravages of consumption show some diminution. Cancer is being studied and we may be just on the verge of discovering its cause and prevention. Industrial welfare and the care of working people is receiving the attention of generous and kindly men, and legislation is reducing the hazard in dangerous callings and protecting to a larger extent than ever before the physical well-being of employees. Sanitation and hygiene, the housing of people who live in congested localities, the care and rearing of the young, and in some countries the agitation of the question of old age pensions and disability protection show the trend of the world's thought and are evidences of man's humanity to man. These factors will all have a decided effect upon the mortality of large masses of people, and our deductions from former experience, our preconceptions and misconceptions, should be corrected and we should keep step with this onward march of progress, science, and brotherly love."

It is to be hoped that your interest on this subject will be increased and the recital of the work which has already been

done by one Company will prove a stimulus to all other Companies. If the health and welfare of the general public is one of the most important national assets, are not money and time well expended to conserve them, and who has greater interest in the health and happiness and general prosperity of our people than Life Insurance Companies? Who can estimate what will be the general conditions in this broad land when the authorities and every corporation employing labor and every Life Insurance Company does its share in this wonderful work?

#### STATISTICS REGARDING PATIENTS AT MT. MCGREGOR SANATORIUM

Number of T. B. patients admitted since Sanatorium opened.....	416
" " " " " re-admitted " " "	17
" " " " " discharged " " "	258
" " " " " in Sanatorium at present time.....	161

#### STATISTICS REGARDING EXTENT OF NURSING SYSTEM

Visits made in various years are as follows:

1909	28,442
1910	290,963
1911	653,424
1912	938,673
1913	1,127,707
1914	1,060,288
1915	1,078,863
1916	803,160 (Up to and including July 31)
<hr/>	
Total	5,981,520

**TOTAL NUMBER OF WELFARE PUBLICATIONS**  
DISTRIBUTED DURING 1915, AND APPROXIMATELY THE TOTAL NUMBER DISTRIBUTED SINCE  
THE DATE OF THEIR ISSUE TO JANUARY 1, 1916

(Excluding special circulars)

Year Issued	PUBLICATION	No. Distr. in 1915	Total Distr. to Jan. 1, 1916
1909	War on Consumption.....	444,525	5,768,525
1910	Directions for Living and Sleeping, etc.....	124,200	404,200
1910	From Flies and Filth—Circular.....	*203,425	1,027,425
1910	Sleeping Shack—Circular.....	117,775	423,775
1910	Wax cups.....	713,200	33,353,200
1912	Tuberculosis Sanatoria Lists (1912 Edition).....	400	11,100
1912	The Child—English.....	332,370	2,122,370
1912	Welfare Work—Policyholders.....	93,825	468,825
1912	Welfare Work—Employees.....	55,850	165,850
1912	Welfare Work—Visiting Nurse.....	412,480	744,480
1912	Baby Circular.....	*228,530	1,454,530
1912	Folding cups.....	1,506,375	1,506,375
1912	Milk Circular.....	*306,000	1,372,000
1912	Teeth, Tonsils, and Adenoids—English.....	400,125	8,435,125
1913	Fake Consumption Cures.....	280,250	825,250
1913	Smallpox and its Prevention—English.....	180,000	695,000
1913	Teeth, Tonsils, and Adenoids (Foreign),—French, German, Italian, Spanish, Polish, and Yiddish. The Child (Foreign)—French, German, Italian, Polish, and Yiddish.....	166,550	746,550
1913	The Health of the Worker—English.....	152,480	902,480
1913	The Health of the Worker—French.....	197,050	1,224,250
1913	Consumption Circular.....	18,845	128,845
1913	Day in the Life of a Fly.....	196,200	864,200
1913	Health Campaign Circular.....	359,675	1,309,675
1913	Health and Happiness League Pledge Folder.....	162,575	482,575
1914	All about Milk.....	134,025	369,025
1914	First Aid in the Home.....	388,675	388,675
1914	A Magic Book of Health Rules.....	455,875	805,875
1914	Measles.....	33,425	194,425
1914	Scarlet Fever.....	*104,500	544,500
1914	Smallpox and its Prevention—French.....	113,400	478,400
1914	Typhoid Fever and How to Prevent It—English. Typhoid Fever and How to Prevent It—French.	8,000	25,000
1914	Welfare Publication Catalogue.....	208,800	953,800
1914	Whooping-cough.....	4,850	30,850
1914	Baby Circular—French.....	*39,725	75,725
1914	Health and Happiness League Pledge Folder— Canadian.....	*557,185	902,185
1914	Health and Happiness League Pledge Folder— French.....	2,125	42,125
1914	Welfare Publications—Circular.....	200	14,200
1914	Veteran League Applications.....	375	4,375
1915	Baby Circular—Spanish.....	*84,100	248,100
1915	Whooping-cough—French.....	184,525	304,525
1915	Measles—French.....	10,950	10,950
1915	Cancer.....	14,600	14,600
1915	Diphtheria.....	4,625	4,625
1915	Safety First.....	270,825	270,825
1915	Pellagra.....	135,930	135,930
1915	The Light that Never Fails.....	472,225	135,930
1915	First Aid—French.....	472,225	472,225
1915	All about Milk—French.....	*184,675	184,675
1915	Hookworm.....	16,850	16,850
1915	How to Live Long.....	7,875	7,875
1915	Leisure.....	5,050	5,050
1915	Guardian Angel.....	11,475	11,475
1915	Play.....	*161,500	161,500
1915	Chinese Doctors.....	*133,000	133,000
1915	To Mothers and Fathers.....	*41,225	41,225
1915	Marriage.....	*124,975	124,975
1915	Fatigue.....	*120,525	120,525
1915	Seven Ages of Woman.....	*133,650	133,650
1915	What Do I Spend?.....	*128,700	128,700
1915	War on Consumption—Spanish.....	*134,250	134,250
1915	Health Campaign Circular—Spanish.....	228,375	228,375
		11,000	11,000
		10,350	10,350
		10,412,545	167,084,845

4,000,000 copies of each of the circulars marked thus\* originally appeared as back cover pages of *The Metropolitan* or as full inside pages of *The Metropolitan*. Adding these copies to the total mentioned above (67,084,845) makes a grand total of 127,084,845.

† In this total (67,084,845) 33,353,200 wax drinking cups and 1,506,375 folding cups are included.

If the papers included in the *Metropolitan Magazine* be included, as of course they should be, the total runs up to nearly 150 millions.



Dr. Wells—I am sure I express the sentiment and voice of the entire Association in thanking Dr. Willard for this very interesting and instructive paper, giving us an insight into what the Metropolitan is doing along lines that we sometimes deem outside of our regular channel of work. It opens up a big subject.

I am going to take this opportunity to introduce to the Association one of the officers of the Equitable who is known to many here, and who is a friend to all. There is no one probably in the Equitable or in any Company, who is more a friend of the Medical Director and the Medical Department, or more interested in the work of mortality savings and medical selection and the work of this organization, as a distinct body, than is the Vice-President of the Equitable, and he has just dropped in. I am going to ask him if he will say a word to us before we adjourn for luncheon. I take pleasure in introducing Mr. John B. Lunger.

Mr. Lunger—It is a great pleasure to be with you this morning, and after the cordial words of welcome which you have already listened to from our President, Judge Day, you will agree that there is little I could add to his greeting.

Although we cannot surround you with the carved woodwork and luxurious furnishings which you will find in some offices, we can give you a warm, hearty, and sincere welcome to the modest Board Room of the Equitable; and we can surround you with keen appreciation of the work which you are all doing for the good of life insurance. I am getting along to the time of life when indulgence in retrospect is something of a privilege, and as I sat in the rear of the room listening to Dr. Willard's interesting paper, my mind went back to the formation of this Society, and two or three years before that to the formation of the Actuarial Society, and I could not help but think of the great changes which have taken place since then in the conduct of our business, and of the growth and application of scientific knowledge. In the Actuarial Society in which at its inception I held the double honor of being the youngest and the least experienced member, there was not a

single Actuary who had been trained for that important branch of our work. Many were expert mathematicians but until called into the profession they had had no opportunity of studying actuarial problems.

As to the Medical Directors. At the time your Association was formed I think I knew three-fourths of the members, and with the exception of those associated with the largest companies, I think I am right in saying that nearly every other Medical Director was associating private practice with scrutiny of applications. We must all view with pride the growth of the two sister societies. I like to call them that, because they have worked together for the good of this great business of ours. I think the Medico-Actuarial Investigation—the M. A. tables as we call them—is the most monumental piece of work of its kind that has ever been accomplished, and to-day, from the modest beginnings of twenty-seven and thirty years ago we have seen developed two scientific bodies that rank in accomplishment and average of intellect with similar bodies in the Old World.

Now I appreciate the work that you are doing, but I must be frank and say that in some respects I am fearful of its consequences. That is a strange statement for one in my position to make, but I will try to tell you what I mean.

I fear that the effect of all your tables and all your writings will result in an ultra-refinement of selection. To me special investigations have a tendency to pull us a little farther away from what I like to consider as the chief function of our business—namely, the insurance of lives. If I could make this business of ours what I would like to make it, I would charge a good round premium and would then, for that premium, insure as many lives as I could and give as much insurance as I could; and I would not concern my head one iota about the dividend that my company might pay or the dividend that your company might pay. As it is, we are forced by competition, and a cultivated demand amongst policyholders, to so conduct the business that, instead of giving a maximum benefit of protection for a premium, we are giving a specified benefit



at a minimum cost. To me it is a perversion of the chief functions of our business. I do not like it. Nevertheless I bow as you do to the exigencies of competition. I object to the growth of the commercial spirit in life insurance and I have always fought it and always will. We ought also to bear in mind that, notwithstanding the investigations which your body and the Actuarial Society are making, in the days of empirical selection we did "pretty well," as they say out in New England. Notwithstanding the fact that then we had little knowledge about many of the impairments which have now been classified, the mortality in the business selected has been favorable, all of which is an argument in favor of avoiding the too literal application of your scientific investigations, viewing the results as helpful to decisions, rather than as absolute.

It is a great pleasure indeed to be with you this morning and, having listened to two of your papers, I am encouraged to express a hope I have long held, and that is, that the time will come when this body and the Actuarial Society will hold one joint meeting each year. All of those who are interested in the actuarial side of the work read a part of the papers that are presented here; and I know that some of you read papers presented before the Actuarial Society. You are doing a magnificent work conjointly and have many subjects in common, therefore why can't you get together at least once a year and thrash out between you the subjects of mutual interest?

Gentlemen, I thank you for the privilege of meeting with you this morning.

Dr. Willard—May I inject here what I should have said to you while I was on my feet? If anybody is interested in any of the details of any of the plans and wants more statistics regarding any of our work, I shall be glad, if you will give me your name, to send you any or all of the pamphlets, etc.

Dr. Wells—Before we adjourn for luncheon I should like to make a request of the gentlemen that, as soon after we finish luncheon as possible, we reassemble in this room promptly

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at two o'clock. We have rather a full program. We are to be honored by the presence of Dr. Mayo, of Rochester, who has come at considerable inconvenience to read a paper. I have promised him right of way. We all want to hear him, so as soon as we finish luncheon, if you will come immediately to this room, it will be very much appreciated.

### AFTERNOON SESSION.

Dr. Wells—This Association has in the past from time to time enjoyed signal honor and pleasure in having various distinguished gentlemen come on to favor us with their views and information. We have to-day the great pleasure and honor of having with us one who needs no introduction to this audience, and who has been good enough to come here this afternoon to treat of a subject of vital interest and importance to the Life Insurance world, and especially to the Medical Departments of Life Insurance Companies, a subject that we have carefully considered from time to time, that of gallbladder operations, their significance, their meaning, not so much the operation, not how the patient endures the operation, but the prognosis, the expectation, the expectancy of life following that operation. I have great pleasure in welcoming to our Association this afternoon, and extending cordial greetings on the part of this Association, to Dr. Charles H. Mayo, of Rochester, Minnesota, who is going to give us the benefit of his experience in a paper on this subject.

### LIFE EXPECTANCY FOLLOWING OPERATIONS ON THE GALLBLADDER \*

CHARLES H. MAYO, M.D., Rochester, Minnesota

No one more than you who are dealing with life statistics realizes the wonderful changes that are so rapidly occurring in the history of medicine; how within a matter of a few years

\* Presented before the Association of Life Insurance Medical Directors, New York City, Oct. 25, 1916.

we have gone from the extensive use of drugs back to the study of the living cell, the way in which Nature deals with diseased organs and the individual cell as differentiated from the general body symptoms which are secondary to the changes in the individual cell. By studying the cell we can determine something about the condition of an aggregation of cells. Further gain did not come from the pathologist, for he gave us only the knowledge of cell change, infiltration and the types of inflammation. He stained his tissues but he did not stain them nor culture them for the bacteria which the bacteriologists show to be the cause of inflammation. There is usually involvement of the tissues by bacteria in the conditions that cause our death, and while we cannot exist without bacteria, often we cannot live with them. The types of cells are very much alike, whether they are vegetable or animal. In the end all two-celled organisms come to natural death, regardless of their type.

Mortality alone has been too long considered to the exclusion of morbidity and we often find that general diseases and local diseases so injure a man as to make him a non-producer even though he may live long. In such cases death eventually is attributed by your statistics to some other ailment, and according to these figures diseases such as those of the gallbladder are rarely given as the cause of death, the death being attributed to pancreatitis, cirrhosis of the liver, diseases of the heart muscle, or kidney diseases. The almost trivial disease conditions of life that impair health and are responsible for a low percentage of mortality only little above the average at the various ages for which statistics are compiled lead to a heavy mortality which in the end is attributed to the wrong thing.

In England, the medical man fought for a long time against social insurance of the people, the idea that all wage-earners should be looked after by the government as an economic problem since they might be lax in expending the money to do it for themselves. Such insurance, however, has turned out for the good of both the laity and the medical profession.

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To-day, as the result of it, the medical man gets paid for what he does, whereas before its introduction he had to do a great deal of work in order to get paid for a part of it. Without doubt, social insurance will come in this country within the next few years as it came abroad. In anticipation of this event the American Medical Association has begun the compilation of statistics on social and industrial insurance.

In the report by your statistician on gallbladder disease it is shown that of those who report one attack, the mortality for different periods varies from one quarter to three tenths of a per cent. higher than the natural death rate. This difference is not very serious, and yet, not only in gallbladder trouble, but in all conditions of chronic local disease, other changes are going on in the heart, the blood-vessels and the muscles. Because of this fact I would suggest that all who have insurance amounting to \$3000 or more should have a free examination once a year. If you are able to tell a person something he ought to know concerning his blood pressure, his heart action or his kidneys, it is probable that he will so re-arrange his affairs as to add five or ten years to his life, when if he continued as before he would have hardly a year to his credit. Many who regularly consult their dentist neglect to consult their family physician for fear of appearing to be unduly worried about themselves, while if they received a notice from the insurance company saying, "This is not going to make any difference in your insurance, and will not add to any charges against you, but is merely to determine for your own good the condition of your health," they would be quite apt to take advantage of it.

In the last century, as you know, many years have been added to the average length of human life. This average, however, has been brought up by saving more babies and bringing more people to middle age. We still cannot bring them to old age and to-day many drop dead between the ages of fifty and sixty who were supposed to be in good health. In such cases death is due usually to disease of the heart, to blood pressure,

or to kidney changes—the many and various conditions that men may have without realizing that they are sick. In spite of our knowledge of the cause and prevention of the great diseases of the world, eight hundred thousand people in the United States died last year of the so-called preventable conditions. Things are better in some communities than in others merely because of education in these communities as to preventive medicine. Typhus, yellow fever, typhoid, all of those great diseases that used to destroy mankind, have practically disappeared or can be made to disappear at least over great areas in communities where proper medical direction in the prevention of diseases is understood and made effective.

The greatest change has come in the last few years in the new knowledge that local disease is instituted and developed by bacteria; that there is no such thing as primary neuritis, *tic dolooureux*, sciatic rheumatism, herpes zoster, or myalgia. They can all be reproduced in a certain definite percentage by injecting animals with bacteria grown from those diseases in man. Our rheumatism, our heart diseases, all endoarterial inflammations, acute or chronic, are due to bacterial toxemia or to bacterial existence. In infantile paralysis experimental research with animals has resulted in our finding the specific germ and being able to-day to bring about a degree of paralysis in animals which varies according to the virulence of the germ and the resistance of the animal. An animal with a high degree of resistance may have the most trivial paralysis, yet the next one may die with complete paralysis. These bacteria can be recultivated in pure culture from various regions of the body—the ventricular fluid or the brain, for instance—and when injected into the veins and circulated about the body, they will pick out the nervous system for their location. The bacteria causing herpes zoster cultivated from man and injected into the rabbit or guinea-pig, will produce the disease on the same side of the body. Appendicitis can be reproduced in the animal. The rabbit is the only animal with an

appendix that is easy to obtain for experimental purposes. The rabbit's appendix can often be thrown into the most acute inflammation by injecting into veins of the ear bacteria grown from tissue of the diseased appendix from man after it has been split, washed and dipped into boiling water and its surface seared. Thus given all the body to select from, these bacteria locate in the appendix in 68 per cent. of all experiments. The bacteria causing ulcer of the stomach localize in the same way. By grinding up the tissues so as to obtain with this type of cell infiltration its own particular type of bacteria, and injecting that culture into veins of animals, ulcers of the stomach can be produced in 74 per cent. of the animals injected.

As regards the tonsil: We do not say that a healthy tonsil should be removed, but we do say that when a tonsil is diseased it is one of the greatest of menaces. It is probably the cause of 90 per cent. of all cases of heart trouble in young people and one of the chief causes of osteomyelitis. In the tonsil also there may be a pure culture of poliomyelitis. In the necropsies made at the New York Hospital for the study of the recent epidemic of poliomyelitis from three to fifteen minute abscesses were found containing pure culture of the micro-organism in the uninfamed tonsil. This micro-organism can be obtained also from the mouth, from the whole alimentary tract, and from the circulation because it is delivered out of the tonsil. We know, moreover, that all of the general diseases have floating bacteria. In obscure cases of pneumonia a diagnosis can often be arrived at more quickly by making a culture from a few drops of the blood than by the ordinary methods of auscultation. Eighty-five per cent. of puzzling cases will show in the blood a culture of pneumococci, and in forty-odd per cent. a blood smear will show them.

Returning to the question of the gallbladder: Is it necessary? What is its function? How does it become inflamed? It has been believed for years that the infection was carried through the lymphatics. Does the infection come through the common duct? While this is possible, the common duct is wonder-



fully protected, passing through part of the head of the pancreas, its opening being behind a flap of mucous membrane which hangs down over it. Archibald has shown a minute muscle surrounding the duct-opening through which the bile passes. We know that duct delivery is practically always intermittent, like the squirting action of the ureter. Thus the bile always passes intermittently because of the rhythmical contraction of the gallbladder and ducts. We have in addition the portal circulation as a possible cause of infection of bile but in this instance the great liver is interposed as a destructive agent of bacteria. It has been presumed, however, that when bacteria come to the liver in large numbers some are passed by way of the portal circulation through the liver into the bile. We now know that bacteria pass into the duct circulation and into the tissues of the gallbladder. In operating we find papillary gallbladder, thick-walled gallbladders, degenerations of all types, including cancer. Only occasionally, in some of the acute, foul-smelling cases of cholecystitis, are the bacteria present in the bile in large numbers. The obstruction and stasis are due to bacteria in the wall which change the mucosa and render it stiff and unable to expand.

Why should we have a gallbladder? We know that it is not found in a number of animals. Moreover some human beings with congenital absence of the gallbladder have been studied. In this respect those human beings resembled the ass. The gallbladder is absent also in the horse, elephant, rhinoceros, deer, and mouse, but these animals have a duct that works just as well. This duct is made up of connective tissue and elastic muscular tissue and is lined by mucous membrane. It pumps in the same way as the gallbladder.

The gallbladder should be capable of distending. In man it is said to have a capacity of an ounce, but in operating we find that it may become distended to a capacity of four or five ounces without knowledge of this distension on the part of its possessor. The distended gallbladder contracts from eight to ten times a minute and thus aids in pumping the

bile through the ducts. When bacteria are present in the wall of the gallbladder, greases, oils, and gas-producing foods as a rule cannot be eaten because the gallbladder cannot expand or contract without causing discomfort. Often as we operate, we find, to our surprise, gallbladders that must have been out of commission for years. In the earlier days when we did not know what would happen if we removed the gallbladder we made every effort to save it. However, these conditions of the gallbladder are not often in themselves fatal. The patients die of secondary degenerations. In many cases in which we formerly failed to take out the gallbladder, thinking it would be better to save it, we had to re-operate because of cholecystitis and in a few cases, for recurring stones. In one fourth of all people who have disease of the gallbladder cholecystitis is present without stones. Most pancreatitis is secondary to disease of the gallbladder.

Recently we have made a review of cases of gallbladder disease. Letters from ten patients whose gallbladders were removed more than fifteen years ago state that they are well to-day and are free from gastric symptoms. During the eleven months from November 1, 1915, to October 1, 1916, 921 persons were operated on for gallbladder trouble and for stones in the common duct. The mortality in these cases was 3.04 per cent. In 43 the gallbladder was merely drained because, on account of age or pregnancy or some serious condition, it was thought inadvisable to remove it. Among these the mortality was 14 per cent., one half of which was for cancer. During the same eleven months the mortality from 719 cases of cholecystectomy was 1.8 per cent. The mortality of operation can be reduced only a part of a per cent. lower than it is. The mortality from cholecystectomy during the years 1907-1910 inclusive, when the majority of patients were treated by drainage, was 1.34 per cent. Accordingly we conclude that a man without a gallbladder is in better average condition of health at the end of one year from the time of the removal of the gallbladder than a man who has a diseased gallbladder, just as a man is a better risk without a diseased tonsil that may



## Mayo—Operations on the Gallbladder 331

be the cause of heart disease, myocarditis, chronic kidney disease, and other conditions.

How do stones form in the gallbladder? We have the bile salts and the stasis and the mucus. From the spores obtained from the interior of stones Rosenow has reproduced the bacteria that caused the stones. All gallstones are secondary to cholecystitis, but an infection which clears up leaving a stone leaves the patient subject to sudden attacks of gallstone colic, which, however, will not be associated with secondary gastric symptoms because there is no cholecystitis. As the gallbladder is able to expand and contract no harm comes from the stone unless it temporarily plugs the ducts. For emphasis we would repeat that a person with diseased tissue in any part of the body that has retained the streptococci for so many years that utter destruction of the tissue has resulted would be a safer risk with the diseased area removed.

Dr. Wells—It is possible that there are some who have questions they would like to present while Dr. Mayo is with us.

Dr. Frank Wells—Dr. Mayo, may I ask a question? Acting upon information which I believe was derived from you a few years ago, that it was dangerous to accept a risk where the gallbladder had been removed, on the ground that the gallbladder played a certain part in digestive operation, I have declined such cases. I want to ask you therefore, now, whether you believe that it is a safe proposition to accept a case where the gallbladder has been removed. I have one more question: how soon after an operation for gallstones, do you consider it safe to take an applicant? In other words, within how many years or within what time is there danger of recurrence?

Ans. 1. A man without his diseased gallbladder is a safer risk than if it had been merely drained. 2. In one year after operation if his health in general is acceptable.

Dr. Rockwell—I would like to ask the Doctor whether he would advocate a more liberal treatment, as I judge he might from his remarks, in cases in which the gallbladder had been removed, or in cases in which a cholecystotomy only had

been done, and if the latter, how long a period would be safe to elapse after the cholecystotomy has been done, before accepting the applicant as an ordinary risk?

Ans. Two years after cholecystotomy if the health is good the risk would be acceptable.

Dr. Frank Wells—Do you make any difference in the removal of a stone from the common duct or from the gallbladder?

Ans. In 86 per cent. of common-duct stone the gallbladder is out of commission, yet if the patient is well two years after operation the risk should be acceptable, possibly at a slightly higher rate because of possible pancreatic involvement.

Dr. Hall—I should like to ask Dr. Mayo in connection with his very illuminating address one question which I think might be asked on the basis of the infections of the blood. I understand that his theory of infection in the intervals between the attacks of duodenal ulcer is that the bacteria are found in the blood. Now this is evidently a process attendant upon infection in connection with adult life. As we get older perhaps we all have more and more tendency to getting bacteria, and we all may have latent infections. Would that possibly interfere with the acceptance of a risk because of that possibility? Can we, in other words, expect to have bacteria in our system latent, say after forty or forty-five years of age? We all have a little nephritis probably; is that bacterial? Are we likely to have bacteria in the blood? I think it would materially alter our ideas of a risk.

Ans. Dr. Hall's question touches upon a very vital question which it will take years of observation to correctly answer. Most bacteria are harmless; if harmful they have selective affinity for certain tissues. Some have high, some low, immunity in certain diseases which can be raised by vaccines as in typhoid fever, small-pox, etc. In others only the disease itself creates an immunity—*e.g.*, the diseases of childhood. Too little attention is paid to the treatment of disease by the elimination of the local focus—in teeth, tonsils, sinuses, gallbladders, seminal vesicles, etc.

Dr. Frank Wells—I have been shocked to hear of the death of our old friend, Dr. Wilkins, and I move that a committee composed of representatives from the Sun Life be appointed to prepare a memorial to be submitted at our next meeting.

Motion was seconded and carried.

Dr. Wells—We are very fortunate in having with us this afternoon a gentleman who needs no introduction to this audience, whom we all know, a representative of the Actuarial Society, who has come here to-day to read a paper on the subject of The Need in Medical Selection of Standards by which to Measure Border-Line Risks. I have great pleasure in introducing Mr. Hunter, Actuary of the New York Life. I assure Mr. Hunter that we give him most cordial welcome to our meeting.

THE NEED IN MEDICAL SELECTION OF  
STANDARDS BY WHICH TO MEASURE  
BORDER-LINE RISKS. 344

By Dr. OSCAR H. ROGERS and ARTHUR HUNTER.

During the past fifteen years there has been brought together and placed at our disposal a vast amount of information bearing upon the subject of Medical Selection. The Specialized Mortality Investigation of 1903, the Medico-Actuarial Investigation of 1915, and the various papers and discussions which have been presented meanwhile before the Actuarial Society and the Medical Directors' Association have placed us in position to speak with considerable confidence regarding the insurance value of the majority of risks which are offered to our companies for acceptance. Indeed, those who would estimate the probable mortality to be expected in connection with most of the simpler combinations of factors, have but to review the evidence already at hand to find material upon which to base a sound judgment.

In this favorable situation of our affairs, it should seem as

if the differences of opinion regarding border-line risks, which formerly were of frequent occurrence, ought to have become greatly lessened. Those of us who have been most optimistic with regard to the effect upon medical selection of these studies in which we have been engaged, have felt that the time has already come when there ought to be a substantial agreement concerning the value of most border-line risks. It is true that in certain doubtful risks the component factors include some which have not yet been sufficiently investigated to warrant a very definite conclusion about them. Sometimes, too, we find that the differences of attitude have been caused by the nature of the medical examiners' reports. One examiner has placed considerable emphasis upon a fact which has been entirely overlooked by another, or touched upon but lightly, so that the pen pictures of the case as presented by the two examiners are different. Then again, some life companies have maintained for many years a very rigid standard selection; others have selected their risks with considerable freedom. The emphasis in the former case has been placed upon mortality savings; in the latter, upon extending the benefits of insurance as broadly as is consistent with safety. Obviously, we cannot expect uniformity of action under such circumstances. But, making due allowance for these differences that are unavoidable, the fact remains that the number of them that are clearly avoidable is still very great. Each one of us who is engaged in medical selection is, day after day, confronted with more liberal rulings on the part of those whose judgment we have every reason to respect. We still hear all too frequently the argument which in the past so often confronted us, that we should accept this or that risk because other companies of equal standing with our own have done so. The character of the selection of each of the companies is well known among insurance men, and this argument, which is apt to be little used with respect to companies which are more liberal, carries increased weight when employed in cases where less liberal companies have accepted the risks which we have declined.

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This situation of our affairs is unsatisfactory; it reflects upon our skill as experts in the selection of risks. We are not making full use of the tools that lie at our hands. We are still employing methods which should long since have been abandoned. If any of us accepts a risk which another has refused, the reason should be, not that we differ materially in our judgment of the value of the risk, but that, knowing full well its insurance value, the company that accepts it does so because it practices a more liberal selection; it draws the line which separates standard from substandard risks a little bit further towards the substandard end of the line.

Does it not appear evident, then, that the task before us is to place ourselves in position to assign a definite value to each risk, a value measured by standards agreed upon among us, acceptable to us, and based upon the best information available at the time of their adoption? We have material enough at hand for the purpose; we have knowledge enough at our command to interpret it aright; why, then, should not the Actuarial Society and the Medical Directors' Association prepare standards, and place them at the disposal of all life companies that may wish to use them in the selection of their risks?

The general use of such standards by the companies would be equivalent to submitting their risks to the judgment, not of individual selectors, as is at present the practice, but of a board of experts. Each risk valued in accordance with these standards would be so accurately measured that its place in any company's membership would at once be determined. It may very well be true that any standards of selection prepared at the present time would be found later to be in some respects incorrect and would have to be modified from time to time hereafter; but, if we employ in the preparation of them the best light at present available, we should still be at an advantage in comparison with the judgment of any individual, however carefully trained, because such judgment must always be guided by the light at the time accessible to all of us.

Nine years ago, in the course of a discussion of the subject

of medical selection, and in speaking of the numerical system in use in the company which we represent, one of us said: "During the nearly four years of the operation of this method of selection, the company has had abundant reason to be satisfied with its accuracy. It produces substantially the same selection as that which for years has been practiced by the company. In another respect, this method possesses great advantage over the old—constant application to the work of selection soon overtaxes the mind of the medical director. His perceptions become less acute and his liability to error increases. I have known thoroughly good men to make as high as two or more errors in a single day. The study of a large amount of business handled by the new method shows us that by reason of the careful analysis to which each risk is subjected the proportion of error is very greatly reduced." Since that statement was made, the very large experience which we have had in the operation of this method of selection has served only to confirm the favorable opinion then expressed. Its accuracy is such that the proportion of discovered error is seldom as high as one error in 2000 cases. With reference to the permanence of our standards it may be said that during the past fifteen years we have twice made considerable changes in them as new data warranted, and, in addition, have made minor changes from time to time. We shall continue to do this in the future just as any of us, in the light of new information, modifies his judgment upon any subject.

In thus referring to the standards in use in our own Company, we do not wish to be understood as appealing for their adoption by other companies. We are appealing for the adoption of *standards*, not for the adoption of our standards.

In the development and application of established standards for the life insurance business throughout the country, it may be that at first only a limited field might safely be covered. For instance, we might take the subjects of *Build* and *Family History*. These are comparatively simple. They are basic, and are still the cause of wide differences of action among the



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companies. The data at hand are abundant, and it should be possible from them to prepare and publish, so that all life companies that care to do so may use them, standards which shall serve to measure every risk so far as these factors are concerned. We feel confident that the insurance value of a substantial proportion of the risks that are at present in doubt would, by this means, be determined with such accuracy that the acceptance or rejection of any of them would thereafter depend, not upon any question as to the value of the risk, but upon the line used by the company dealing with it, to separate its standard from its substandard or rejected risks.

The adoption by our Societies of standards to be used in determining the insurance value of border-line or doubtful risks would certainly result, sooner or later, in the use of these standards in the valuation of all risks, because, having once subjected any part of its business to the careful analysis and close scrutiny involved in this method, no company would thereafter be likely to abandon it in favor of the old, which depends upon the judgment of the individual selector.

In various papers dealing with this subject of medical selection each of us has described, on more than one occasion, the underlying principles involved in the use of established standards, and those who have followed the literature of the subject are familiar with the discussions which have followed its presentation. We shall therefore limit ourselves to a brief statement of the method, and of the manner of its application to the valuation of risks.

The factors which enter into the composition of every insurance risk are the following:

1. Build,
2. Family history,
3. Physical condition,
4. Personal history,
5. Habits,
6. Occupation,
7. Habitat,

8. Moral hazard or insurable interest.
9. Plan of insurance applied for.

The medical director as he reviews a risk takes into account each of these factors in turn, and his final conclusion expresses the effect produced by all of them upon his mind. "He mentally determines that a case has so many favorable points, and so many unfavorable features, and, after balancing these in his mind, he decides whether it approximates closely enough to the standard to be accepted at the regular rates." Indeed, his "final judgment is the mental algebraic sum of these various factors," and "the underlying idea in this method of medical selection is to express the value of each of these factors numerically in terms of some standard, and, by the summation of them, to determine the value of the risk with relation to that standard." We begin, then, with the build of the applicant, his height and weight, and having ascertained how much under or over weight he is as compared with the average weight at his age, we assign as a foundation rating the mortality which experience has shown to be due to that build. We may say that a comparison of the results of the Medico-Actuarial Investigation with the standards we use shows a substantial agreement between them excepting at the extremes of the table and at the older ages where the differences are no doubt due to the fact that, in the preparation of our working standards, allowance was made for both selection and anti-selection. It must always be remembered that the mortalities found in any groups of selected lives have been influenced by the selection to which they have been subjected, and that if we wish to use the mortalities experienced in them as guides for future selection, we must see that the same severity of selection is practiced, or that due allowance is made for it in the standards which we employ. In any group of selected lives which are of average type in all respects, we may be sure that the selection has not been rigid; where the lives depart considerably from the normal in any factor, they have been selected with greater care with regard to all other factors.



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Indeed, the further any homogeneous group of lives departs from the normal, the more severe must have been the selection in that group. It follows, therefore, that the results obtained in any rigidly selected group may not be used as standards for future selection of similar risks, unless allowance be made for the effects of the rigid selection practiced in the group. In the same way, we must remember that where, for the purpose of providing for an excessive mortality, higher priced plans of insurance are offered than those applied for, an advance in age, or an addition to the premium used, the best of the risks will be apt to refuse the offers made, and the less desirable ones accept them. This is what we mean by the influence of selection and of anti-selection. Those who have had experience with insuring border-line and substandard risks will fully appreciate the importance of these considerations. Let us suppose, for example, that we have before us two build groups of risks accepted on standard plans, one of which has shown a mortality of 110 per cent., and the other a mortality of 175 per cent. We should probably be safe in accepting the testimony of the former group as it stands, and in any future selection of placing a valuation upon similar lives, little, if any, above 110 per cent.; but, in the latter group, if we wish to insure them as substandard risks, realizing that the risks, in spite of the rigid selection which must have been practiced upon them, have produced so high a mortality, we should certainly have to add considerably to our ratings, and to place upon them a valuation of, say, 200 per cent. to overcome the anti-selection bound to occur among risks so highly impaired. The best of those risks, feeling themselves entitled to more favorable insurance, will refuse the offers which we should be obliged to make; the less desirable of the risks will accept our offers. Due allowance having been made in this way, the results of the Medico-Actuarial Investigation might safely be used as standards for the future valuation of risks.

In a paper read before the Actuarial Society in October, 1914, Mr. Little presented a table of mortality according to

height and weight, as derived from the data of the Medico-Actuarial Investigation. We are led to mention this table because, in the first place, Mr. Little gives good reasons for stating the departures from the average weight in pounds instead of in percentages, although we believe that these reasons are not sufficient to warrant a change of method in the companies which use percentages of departure from the average rather than pounds of departure. In the second place, he is, we believe, the first to publish in detail the differences in mortality due to differences in height alone. The evidence is quite strong that the element of height makes a substantial difference at some ages and at some degrees of over and under weight, and that, in the preparation of standards, these differences should be taken into account.

Returning to our subject, the use of standards has another advantage which, in our experience, is very great, namely, in connection with cases brought up on appeal. Among these cases it is very difficult, unless we have at our hands strong statistical evidence to the contrary, to meet the plausible arguments that are adduced that this, that, or the other risk should be accepted in the ordinary class; standards of the sort we recommend would go far towards securing a satisfactory settlement of many of these doubtful cases, and would be of great service in fixing a definite valuation upon many cases now the subject of difference of opinion.

Reference to the influence of family history leads us to say something upon the manner in which we have met that problem. Just as there are differences in degree of over and under weight, so there are differences in type and significance of family history, and for a long time we were perplexed to know just how to distinguish with reasonable accuracy between them. Our observations led us to believe that, between the very good family histories on the one hand and the very poor ones on the other, the differences in mortality occurring in connection with family history alone, leaving out of consideration cases of very marked hereditary tendency, were probably expressed by about 30 per cent. of the average mortality, and

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we believed that if we gave the best of them a credit of 15 per cent., and the worst of debit of about 15 per cent., we should be expressing the probable range of influence with a fair degree of accuracy. The next question was to distinguish the various family histories, and to determine what debit or credit should be assigned to each. To this end we had copies made of a large number of family histories. These were marked for identification and submitted independently to the judgment of a number of physicians skilled in such work, each one of whom was requested to indicate, as to each family history, whether it represented a

	Very good,	= 1,
	Good,	= 3,
	Average,	= 5,
	Fair,	= 7,
or	Poor,	= 9,

family history, and by assigning numerical values as indicated above, and making for each a summation of the valuations thus secured, we obtained a guide to their probable consecutive order and arrangement according to the value of each, so that lay persons by studying them were able to become very expert in judging the weight to be assigned to any family history. Usually the variations between the opinions of two lay reviewers are not more than five points, rarely ten points; that is, where one reviewer estimates a family history to be zero or average, another may estimate its value to be minus 5 per cent. or plus 5 per cent.; and it is only occasionally that one reviewer estimates the family history to be minus 5 per cent., and the other to be plus 5 per cent. Indeed, it has been our experience that lay reviewers, after a fair amount of drill in this subject, became so expert that they are in substantial agreement, day after day, as to the value to be assigned to each family history.

As to a family history of consumption, the results of the Medico-Actuarial Investigation have been very helpful to us, and we have found reason to make some changes in our stand-

ards of that impairment. We believe, however, that, because of a disregard of the effect of the rigid selection to which these risks were subjected, the results of that investigation have led to too great a liberality among many of the companies, and that, if the adoption of standards had no other effect than to secure greater uniformity among the companies with respect to this impairment alone, the undertaking will prove to have been of real value to the business.

Here again we should like to emphasize that we are not appealing for the adoption by the companies of our standards, but rather for the adoption of standards which express the judgment of experts in such matters after a careful study of the data brought out by the Medico-Actuarial Investigation.

About the practical use of standards in the valuation of lives for insurance, we wish to say that for many years we have made use of them, and have in our medical department a division made up of clerks trained in their use, and very expert in their specialty. Our medical papers are so arranged that one clerk, having assigned a numerical value for each one of the factors referred to, and, by their summation, determined the value of a risk, is able so to fold the papers as to conceal the valuation thus obtained. The case is then submitted to a second clerk who, without reference to what has already been done, measures and makes an independent record of the risk. These two valuations are then compared, and, where they agree, we accept the result in so far as build and family history are concerned, as a final determination of the value of the risk. The advantage of having two reviewers, working independently, go over each application, study it carefully, and place a valuation upon it, is so great that we should not think of abandoning the method for any other with which we are acquainted. Those who have not seen the system in operation can form no idea of the accuracy which these lay clerks acquire in the handling of routine business. Our experience has been that, after careful training, the activities of lay reviewers may safely be extended far beyond the determination of the significance of these fundamental factors. In doubtful and

border-line cases, however, or where the amount of insurance involved is large, a comprehensive and exact valuation requires the co-operation of medical experts. Any group of lives, homogeneous in so far as the fundamental factors are concerned, includes individuals which are better risks than the average of the group, as well as those that are not so desirable as the average, due to favorable or unfavorable hereditary tendencies, to slight differences of occupation, of habits of life, and the like. Evidently an individual risk, measured purely mechanically, will be found of equal value with every other in the group. Agents who present these risks to the companies are very diligent in emphasizing the favorable features of their cases, but we may be sure that there is no disposition on their part to emphasize the features that are unfavorable. The basic facts of the record are supplemented by testimony calculated to distort the picture in favor of the applicant for insurance, and it requires a nice discrimination to recognize those other features of the case that are not so favorable. Risks near the border-line have to be very carefully studied, and the value of definite standards lies in the circumstance that they express with great accuracy the mean or average value of the group, and furnish the selector with a basis upon which to make those fine distinctions necessary to be drawn in the accurate valuation of doubtful risks. Work of this sort falls within the province of the medical expert. When a risk is found by the use of established standards to be near the border-line, it then becomes the legitimate subject for the special consideration of the medical director. Indeed, it is among these border-line risks that the assistance of the medical expert is especially necessary.

In conclusion, the value of standards lies in the fact that they afford a solid foundation upon which a more accurate selection of border-line risks may rest, and our Societies can engage in no more valuable enterprise than to complete the work of the Medico-Actuarial Investigation by preparing and recommending for general use among the companies standards by which to measure the value of lives for insurance.

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Dr. Wells—I am sure that we have enjoyed this paper very much. The subject has been presented in a most able and interesting way.

Dr. Toulmin—In addition to expressing my thanks for this very interesting paper, on a very practical subject, I would like to move that this Association appoint through the Executive Council a Committee to meet with the Committee of the Actuarial Society, to take up this whole question with power to act. I believe they have a committee of four in the Actuarial Society, and it would be well for this Association to have a committee of four.

Motion was seconded and carried.

Dr. Wells—We will hear from Dr. Symonds of the Mutual Life whom I have asked to open the discussion of this paper.

### DR. SYMONDS'S DISCUSSION

The admirable paper which we have just listened to is a distinct contribution to our methods, and I trust very much that it will lead to a substantial improvement in the accurate rating of many items of selection. It is a plea, in part, to interpret the bald findings of the Medico-Actuarial Committee. This Committee believed earnestly that it was not justified in interpreting any of the tabular results of its work. It was content to let these results speak for themselves and only drew attention in a few cases to pitfalls which were not obvious and which would have caused most serious trouble. By rigidly refusing to interpret the results, even in the arcana of the Committee, we were enabled to publish our investigations in record time. If we had stopped to discuss the exact bearings of our statistics on the selection of risks, the Committee would still be in session and nothing would have been published to this day. As it is, the reports have been out for some time, the second volume on Build having appeared in 1913. The beneficent shower of figures has had time to sink into fairly fruitful



soil. Such excellent papers as those of Little and Welch on Build, have appeared as choice fruits, for both these papers are based upon the Medico-Actuarial Reports alone. There remains, though, a very large field and it will be of the greatest possible benefit to see that this field produces good fruit and no weeds. If an official, or even semi-official interpretation can be given by this Association to certain fundamental facts, it will enable the companies to select the border-line cases with much greater accuracy than they are now doing. If along with this work on the Medico-Actuarial Reports we can obtain some help from those companies which are operating a distinctly substandard line of risks, it will be of value to those companies who theoretically issue insurance only on standard plans.

The New York Life is entitled to great sympathy at the present time. It has developed a very valuable adjunct to ordinary life insurance in its substandard work and this development has been due almost entirely to the authors of the paper—Doctor Rogers and Mr. Hunter. They have seen this scheme grow into a very vigorous line of business and they have developed, as a result, many competitors. My own company does no substandard business if it knows it. I am told by agents, however, that when we reject a case it is taken to the New York Life, in nine cases out of ten, to see if that company will issue a rated-up policy. In a large percentage, the applicant gets a rated-up policy, say for seven years. He then promptly goes to another company which also issues substandard policies, and after some explanation and discussion he gets a policy rated-up six years or else is declined outright. If he is declined outright, he naturally takes the New York Life policy at seven years, but if he can get one with the other company with a six-year rating, he prefers that. There has developed in this way a distinct adverse selection so far as the New York Life is concerned, and I think that this holds true of all companies which are now doing a substandard business. The net result is that these companies are competing against each other in the selection of their substandard

risks and it will be of the highest value for them to have impairments so accurately rated that competition in selection will not involve the cutting of rates. To those companies, like ourselves, who do theoretically no substandard business, this matter is of less consequence, but even to us it will be of great value. I can say for the Mutual Life that we will gladly give our own experience in any matter that will help the accurate selection of risks.

The scheme for the selection of risks, outlined in this paper, provides for a numerical rating of nine factors. These factors are rated plus or minus as they are good or bad. There is one factor, however, which has been entirely overlooked apparently, and that is, the comparative value of the Medical Examiner. Medical Examiners differ greatly both in their professional skill and in their ability to give a faithful pen picture of an applicant and his history. The inferior medical standard in some States is one of the items which leads to general high mortality in that State but not every Medical Examiner in that State is deficient. Conversely, in States which secure generally good medical service, not all of the Medical Examiners can be rated equally. Like the Kentucky colonel's whiskey, they may be all good but some are better than others. While the difference in medical skill is distinctly noticeable in the selection of standard business, I should think that it would be of much greater consequence in the selection of substandard business. There is no skill required, of course, in weighing and measuring an applicant, but there is some medical skill requisite for obtaining a correct family history, and certainly a high grade of medical skill is required in determining the physical condition and the personal history of disease. How do the authors treat this factor of varying skill in Medical Examiners? The ratings could be made to cover the skill of the most inferior Medical Examiner, but that would not be fair to those applicants who were examined by a more skillful examiner, for then they would be underrated.

As regards the Build of applicants, I quote from my address to this Association in 1912: "For many years I have felt



that the average weight in the younger and in the older ages does not coincide with the weight showing the lowest mortality at those ages. In 1908 (4) I stated that weights a little above the average gave the lowest mortality in the younger ages, and weights a little below the average gave the lowest mortality in the older ages. You will remember that Dr. Rogers demonstrated this most beautifully two years later to the Association by a model showing the range of mortality as affected by physique, according to the experience of the New York Life. In view of the fact that the Medico-Actuarial Investigation will soon publish the results of the mortalities of some nine hundred classes of weights, should we not take advantage of this to determine a table of weights graded according to the best mortality? Ought not the Association take official notice of this fact and stamp such a table with its approval by referring the matter to a committee who will prepare it? By so doing, the Life Insurance Companies will then have a table of heights and weights which will be a standard guide on the determination of the proper physique. I am confident that such a table can be prepared and I recommend that a committee be appointed for that purpose." The Association at that meeting adopted the following resolution: "Resolved (if the Actuarial Society concur) that the Sub-Committee in charge of the Medico-Actuarial Investigation be requested to prepare—if they find it feasible to do so—a table of heights and weights which will accord with the lowest mortality; and further Resolved that said table be published, if prepared, in that part of the report of the Medico-Actuarial Mortality Investigation which incorporates the study of the Build-groups." The Actuaries on the Sub-Committee, however, said that it was not practicable to compile such a table at that time and we had to wait for Mr. Little to blaze the way. Mr. Welch had a change of heart and gave us last spring his excellent paper on influence of Build on mortality by attained ages. If we can only persuade the Actuaries who were on that Sub-Committee to really interpret for us the results of that profound investigation on Build, they will give us a table which

will really tell us what we should expect from that most important item in the selection of risks. I am delighted that Hunter and Rogers are willing now to take hold of that item and I hope they will give us the benefit of their great experience.

With regard to the plan of insurance, self-selection by the applicant on the original application is undoubtedly of consequence. Endowment plans are usually accorded the lowest mortality; next higher comes the life and life limited and the poorest mortality is furnished by the various kinds of term insurance. When the plan originally applied for is modified by the Company, we then find that the same result does not show. In this case the modified plan is very apt to be accepted by the applicant only if he cannot secure something nearer his original application in another Company. In the Mutual Life we occasionally make an offer of an Endowment plan to a risk who has applied for term or life. Similarly, we occasionally make an offer of life or life limited to a risk who has applied for term insurance. The following table shows the mortality and losses of these "Best Offers" in recent years:

ISSUES OF 1909-1913—EXPOSURES OF 1909-1914, BY THE M. A. TABLE.

BEST OFFER, ENDOWMENT

ON APPLICATIONS				ON AMOUNTS			
<i>Deaths</i>				<i>Death-Claims</i>			
Expos.	Act.	Expected	Ratio	Expos.	Actual	Expected	Ratio
3,553	21	21.842	96.4	\$9,305,050	\$67,000	\$64,919	103.2

BEST OFFER, LIFE AND LIFE LIMITED

2,476	15	15.612	96.2	\$9,362,600	\$54,800	\$58,124	94.3
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As you will see, both sets of "Best Offers" show about the same mortality. It is not bad, but it contrasts unfavorably with a general Company mortality for the same experience of about 72 per cent.

Has the change in substandard plans, which was forced by the Armstrong Laws ten years ago, made an appreciable difference in the results in substandard classes?

I think there is some question as to the influence of "severity in selection" when we interpret the results of the Medico-Actuarial Investigation. The Build cards, upon which the study of Build was based, were entirely distinct from other cards which showed the impairments, occupations, etc. These Build cards, therefore, did include all the risks in certain Build groups, irrespective of the fact whether the risk had a medical impairment or was in one of the doubtful occupations. The farther the Build was removed from the average, therefore, the more likely that the risk had none or very few impairments, and that those in doubtful or hazardous occupations were excluded. In this item of Build, therefore, the results of the Medico-Actuarial Investigation have been influenced by more care in the selection of risks who were decidedly overweight or underweight. For this reason the influence of Build, as reported by the Medico-Actuarial Investigation, requires very careful interpretation. It is a question, though, whether the medical impairment classes were affected to any great degree by this care in selection. Before any medical impairment was studied, all the hazardous occupations were discarded and all cases showing more than that one impairment were discarded. The effect of that process is very well shown in the mortality results of Class 38, C. and D.—"Malarial Fever, excluding pernicious and remittent fever, one attack more than five years prior to application, habitat Canada and the United States, excluding Southern States." This class as presented by the Medico-Actuarial Committee, is one which includes no hazardous or semi-hazardous occupation, no history of serious disease (for everyone will grant that one attack of chills and fever more than five years ago in the Northern States and

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I think there is some question as to the influence of "severity in selection" when we interpret the results of the Medico-Actuarial Investigation. The Build cards, upon which the study of Build was based, were entirely distinct from other cards which showed the impairments, occupations, etc. These Build cards, therefore, did include all the risks in certain Build groups, irrespective of the fact whether the risk had a medical impairment or was in one of the doubtful occupations. The farther the Build was removed from the average, therefore, the more likely that the risk had none or very few impairments, and that those in doubtful or hazardous occupations were excluded. In this item of Build, therefore, the results of the Medico-Actuarial Investigation have been influenced by more care in the selection of risks who were decidedly overweight or underweight. For this reason the influence of Build, as reported by the Medico-Actuarial Investigation, requires very careful interpretation. It is a question, though, whether the medical impairment classes were affected to any great degree by this care in selection. Before any medical impairment was studied, all the hazardous occupations were discarded and all cases showing more than that one impairment were discarded. The effect of that process is very well shown in the mortality results of Class 38, C. and D.—"Malarial Fever, excluding pernicious and remittent fever, one attack more than five years prior to application, habitat Canada and the United States, excluding Southern States." This class as presented by the Medico-Actuarial Committee, is one which includes no hazardous or semi-hazardous occupation, no history of serious disease (for everyone will grant that one attack of chills and fever more than five years ago in the Northern States and

Canada signifies nothing), no distinct taint in the family record, no bad habits, and the physical condition at the time of the examination was good, though there are doubtless some overweights and some underweights in the class. The net result is a mortality of 85% and it is a class in which there has been no intentional severity in selection. This particular group of cases represents a standard which we should consider as par, instead of our present standard, which is fifteen points out of the way. We have here a naturally, not rigidly, selected group and when interpreting the effect of medical impairments we should bear in mind this factor. If a Medical Impairment Class shows a mortality of 115%, we should really regard it as thirty points in excess of a normal mortality instead of fifteen. This does not apply to our investigation into Build, for we did not exclude from it these unfavorable factors.

With regard to family history, I must dissent from the plan described by Doctor Rogers for rating family histories by vote. I gave that method a thorough trial and reported the results in 1912 to the Association and quote from my remarks at that meeting. "I took five hundred selected lives residing north of Maryland and the Ohio River and east of the Mississippi River, whose weight was within 5% of Shepherd's Table. All cases that showed any tuberculosis in the family history were excluded and also those who were engaged in liquor traffic in any way. The cases were all issued between 1880 and 1890 and the period of observation terminated at the anniversary of the policy in 1909. The family histories were then rated by over twenty men who were trained in the selection of risks, mostly medical but including a few laymen." Most of the voters were in The Mutual Life, but there were several Medical Directors of other companies who also voted. "The numerical expression of their votes ranged from one hundred at the top to forty at the bottom of the list. I then divided the cases into four groups and calculated the expected mortality according to the method used in the Specialized Mortality Investigation." I hope that Rogers will subject his voted and rated family histories to the same acid test.



The results astounded me, for there was a difference of seventy-eight points between the best and the worst instead of thirty points as I had been taught by Brother Rogers to expect. In order to bring that list up to date, I have had the mortality recalculated according to the Medico-Actuarial Mortality Table and brought down to the anniversary of the policies existing in 1915.

EXPECTED MORTALITY BASED ON THE MEDICO-ACTUARIAL MORTALITY TABLE.

ISSUES OF 1880 TO 1890 INCL.—EXPOSURES OF 1880 TO 1915—MALES.

Numerical Rating	Number of Entrants	Deaths		
		Actual	Expected	Ratio
From 100 to 86 incl.	103	18	30.460	59.0
From 85 to 71 incl.	150	36	38.861	92.5
From 70 to 56 incl.	182	44	37.477	117.5
From 55 to 40 incl.	65	20	16.354	122.4
Total	500	118	123.152	95.8

You will note that the difference between the best and the worst by this new calculation is sixty-three points instead of seventy-eight by the former table. This is more than double the thirty points' difference which Dr. Rogers allows, and the explanation seems to be that my worst cases undoubtedly included a large proportion of tainted family histories and were short-lived as well. Now, longevity alone will cause a difference of 23% between the longest and the shortest untainted family histories, but when you combine a short-lived family history with a family taint, you will get a mortality 60% or 70% higher than a long-lived untainted family history gives. We are reconstructing our ideas, moreover, as to what constitutes a taint in family history. It is of less consequence for

life insurance than for clinical medicine to determine whether a disease is actually inherited or only the predisposition thereto. In fact, so far as life insurance is concerned, the main thing to determine is whether any disease in the ancestors or collaterals affects the prospects of longevity of our applicant, and, if so, how can we determine the presence of that disease in the family of the applicant? Tuberculosis is undoubtedly a taint, especially in the earlier years of life. Comparative immunity in older ages is probably due to the fact that most of us have had tuberculosis and have recovered from it, but with an accumulation of antitoxin sufficient to prevent any further attack.

According to the Medico-Actuarial Reports, cancer seems not to be a taint affecting longevity. This is also true of insanity, according to the methods of selection practiced by the companies, when two or more cases of insanity were recorded in the family history. It would be of very much interest to find out in how many of these cases either one or both of the insane members of the family suffered from senile dementia and died over seventy years of age. Such a death has no real bearing on the question of insane family tendency, for the bulk of these cases of senile dementia over seventy are really due to disturbances in the general circulation and are arterial or cardiac in origin. Although the number of deaths in this Class 57 was small—only twenty-nine—the ratio is so low—74%—that it certainly eliminates insanity as a taint unless the age at death was young.

On the other hand, both heart disease and apoplexy show a distinct capacity for tainting the family history in a way to affect longevity. In the studies on family history which I presented to this Association in 1912, I showed the mortality results of the Mutual Life in Medical Impairment Class 56—"Apoplexy or Paralysis in the family record, two or more cases," the mortality for the whole Class being 124%, somewhat worse than the Medico-Actuarial results. Those cases in which both parents attained the age of seventy showed a mortality of only 101.8% while in those cases in which both parents died below seventy, one of them perhaps below sixty



even, showed a mortality of 157%. A study of medical impairment Class 61, "Heart Disease in the family record, two or more cases," in the Medico-Actuarial Investigation, shows a general mortality throughout life of 113% but it is much higher than that for the ages fifteen to thirty-nine. From age forty to age fifty-nine, the first five policy years show decidedly better results than the subsequent policy years. It is possible that both apoplexy and heart disease are simply manifestations of syphilis. Careful investigation by competent trained observers show that syphilis is present to a large degree in that portion of the public from which we draw our applicants. When subjected to the Wassermann test, West Point Cadets recently showed a double plus reaction in 2½%. Among common soldiers in the United States Army who were enlisting for the first time, and had passed the rigid physical examination not over one week previously, the Wassermann test gave double plus reaction in 7¾%. It is to be noted that these were men who had actually been accepted as soldiers, all the weaklings having been weeded out by the prior physical examination.

In a paper by Warthin of the University of Michigan, just published in the October number of the *American Journal of the Medical Sciences*, he states that when careful microscopical examinations of the tissues were made, one-third of the autopsies on adults at that hospital showed the presence of the syphilitic spirochete, the *treponema pallidum*. I cannot do better than to quote from his article. "Our autopsy material comes almost wholly from the University Hospital, a State Hospital whose patients represent the average middle-class population of the State. It is important to note the prominent incidence of latent syphilis in this class, about one-third of the adult autopsies. Still more important is the fact, already mentioned, that the greater part of these latent cases give no clinical history of syphilis and are in ignorance that they have acquired the disease. They entered the hospital for other conditions, most prominent of which are cardio-vascular-renal symptoms and conditions. Only the autopsy reveals

that they are spirochete carriers and have a latent infection of very low virulence, which in all of the cases must be very old and not recent, because of the fibroid character of the lesions. Most of the lesions found represent healed syphilitic areas, but in all cases active areas of inflammation are still present, and can always be found after a search more or less prolonged as the case may be. The same histological changes, often of the same degree and extent, occur in the heart, aorta, pancreas, and testes of all cases of syphilis, treated, 'cured,' untreated, and unsuspected.

"The sociological importance of this is very great. It places latent syphilis upon a plane of importance nearly, if not equaling, that of tuberculosis, as a factor opposed to the health and progress of the race. Latent syphilis, I believe, will be found to be the chief factor in the production of myocardial insufficiency and the cardio-vascular-renal complex apparently so rapidly increasing.

"My pathological experience makes me believe that the heart and aorta of every latent syphilitic are involved in the infection. From the standpoint of Life Insurance, latent syphilis becomes a medical and sociological factor of the greatest importance. The spirochete carrier is a bad risk. He is also a possible source of danger through infection to those with whom he lives in most intimate contact. In these old latent cases seminal transmission is probably the most dangerous possibility to be considered.

"As to the Wassermann reaction in latent syphilis a certain percentage of cases will give a positive reaction, but many will be found to have a negative reaction. Blood and spinal fluid will often give contradictory results. Under given conditions only strongly positive reactions have any positive diagnostic value; the negative Wassermann cannot be taken as any evidence of the absence of latent syphilis."

These results may be looked upon as an extreme indication of the existence of syphilis in our insuring populace. Even if a liberal allowance is made because the results were obtained from hospital patients and the number of autopsies was not

large, its importance remains very great and I have become convinced recently that it must not be overlooked as a matter of family inheritance. It certainly is a taint of the deepest dye and perhaps a more intimate study of our records, where apoplexy, paralysis, heart disease, arterio-sclerosis, and insanity are given as causes of death, may prove of profit to us by developing cases which show a family taint of syphilis.

We come back again to the statement that family history is profoundly modified by the two factors, taint and longevity, and that these two factors are quite distinct.

So far as longevity is concerned, it seems to make a difference of about twenty-three points between the longest-lived family record and the shortest-lived family record, and I doubt if the difference is as great as this, if all tainted cases are eliminated. Cases with a very long-lived family history untainted, will show a mortality of about 85% of the normal. To determine that all taint, especially syphilis, is absent from a short-lived family record has become very difficult. When I reported in 1912 to this Association the mortality of short-lived untainted family histories, all family histories showing any tuberculosis were excluded, and also all family histories showing two or more cases of cancer, or of paralysis and apoplexy, or of epilepsy, or of insanity, or of heart disease, or of diabetes. With such limitations the mortality of the short-lived untainted family histories was 110%, but it is very likely that some of these family histories were more or less tainted with syphilis. For example, one death of heart disease and one death of apoplexy in the parents, who both died below sixty, did not exclude such a risk from my list, but with our present knowledge the chances are about one to two that syphilis was present in that family record.

The accompanying curves show the effect on mortality of long-lived and short-lived family histories, as set forth in my report in 1912.

Sheet "A" shows the select mortalities found in the first four policy years. The solid curve is the M.A. select. You will note that the long-lived curve is lower than the M.A.

throughout, four or five years lower on the average until about age sixty, after which the difference is very slight. On the other hand, the short-lived curve is much higher than the M.A., in the younger ages, being nearly ten years higher to age thirty. After that the difference diminishes until at age fifty-one it actually becomes lower and remains so until fifty-four, when it again becomes higher, though only a year or two.

Sheet "B" shows the ultimate mortalities found after eliminating the first four policy years. The solid curve is the M.A. ultimate. The long-lived curve is below the M.A. about eight or ten years in the early ages. This difference gradually diminishes until at age sixty-seven it actually passes above our standard, forcibly reminding us that "threescore and ten" still has its significance. The short-lived curve is usually a little higher than the M.A. but it fluctuates considerably owing to paucity of data.

Causes of death in risks with long-lived and short-lived family records showed a large incidence of degenerative diseases in the short-lived cases, especially in the ages below fifty.

A disease is an acquired characteristic and as such the biologists say that it is not transmitted to succeeding generations. Is it not possible that the real taints in a family which affect its longevity are due to parasites, such as the bacillus tuberculosis and the treponema pallidum, and that these are passed with more or less harm from one generation to another? If so, a long-lived family record would signify simply a family without taint, and should be considered the normal condition.

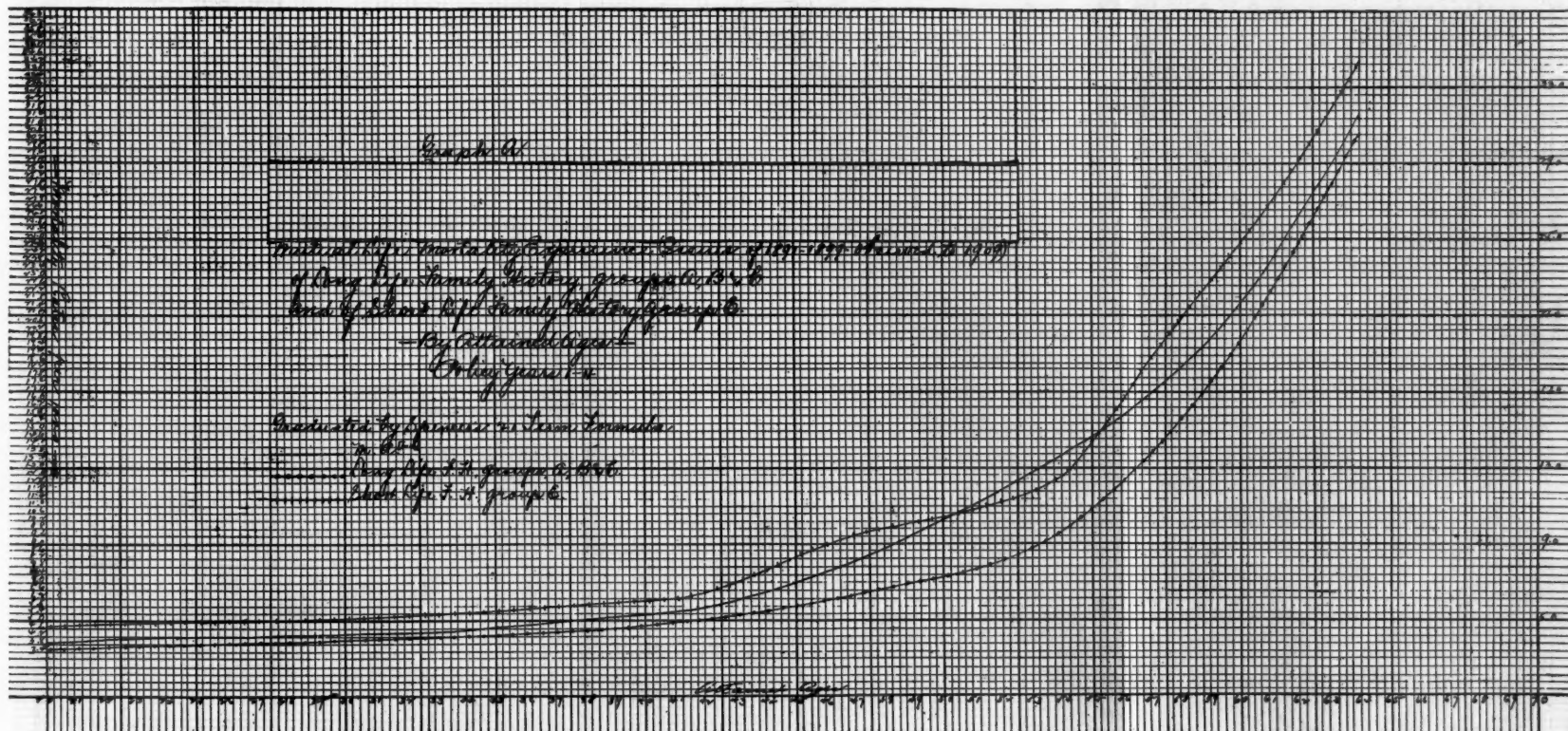
One possible sequence of the promulgation of standards may be a tendency to overlook favorable factors in the selection of border-line risks, though that would not apply to those companies which are rating their risks numerically and which take account of these favorable factors. In companies which are not issuing substandard policies, the tendency might be to overlook such factors as total abstinence, long-lived family history, highly favorable occupations, etc., which in themselves tend to overcome a considerable grade of impairment. On account of this and other objections, the term "standard"



Graph 61

Estimated life expectancy in Canada of 1891-1899 and 1900-1909  
 of Long Life Family History groups (B.C.)  
 and of Short Life Family History groups (B.C.)  
 by 10-year age groups

Indicated by lines as shown in Canada  
 by 10-year age groups  
 Long Life & Short Life groups (B.C.)  
 by 10-year age groups

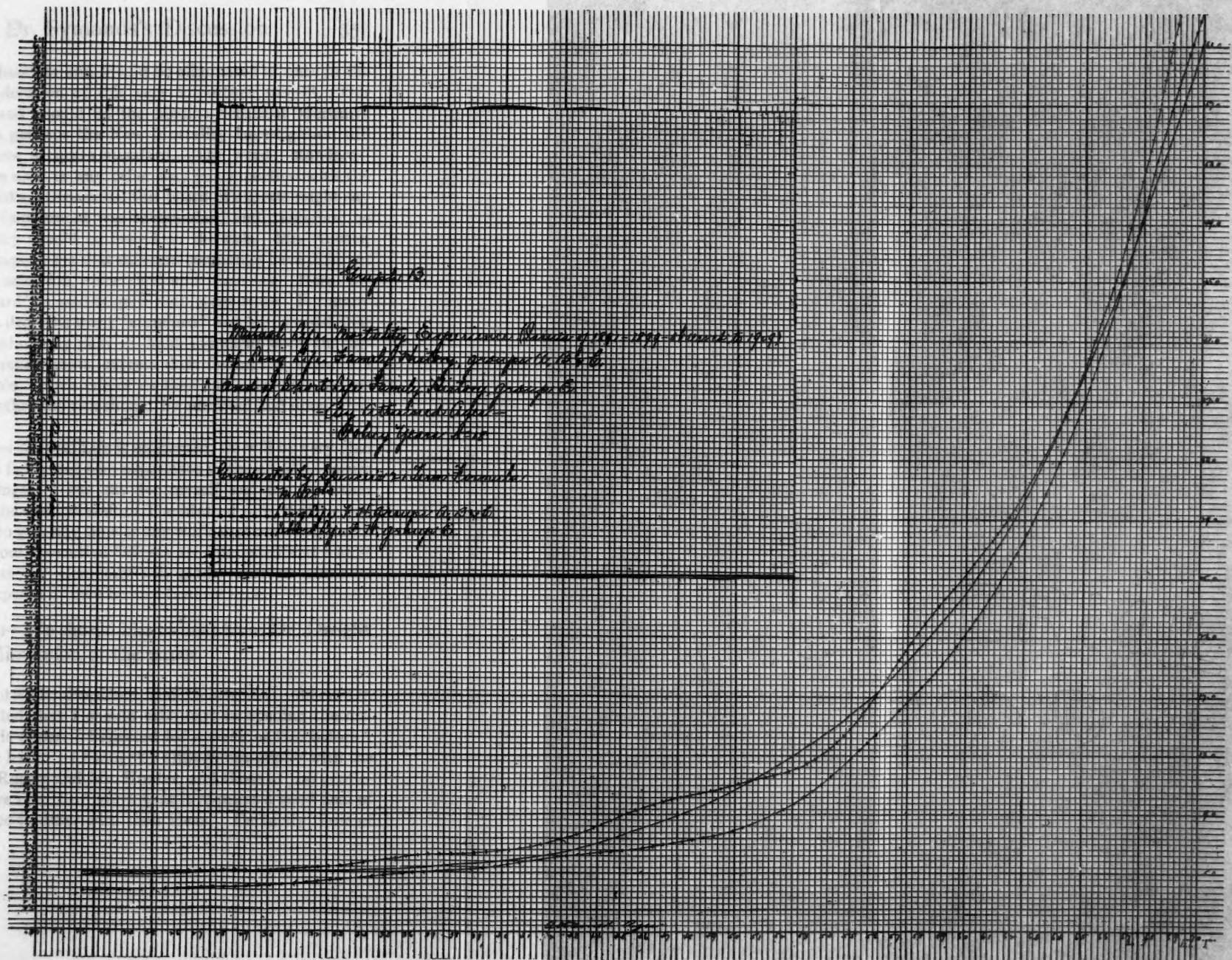


III

# Graph 13

Human Life Mortality Experience Period 1891-1907 - Standard 1909  
 of Long Life Family History groups 16, 17 & 18  
 and of Short Life Family History groups 16  
 - Long Life Family History  
 - Short Life Family History

Mortality Experience Period  
 - Long Life Family History groups 16, 17 & 18  
 - Short Life Family History groups 16



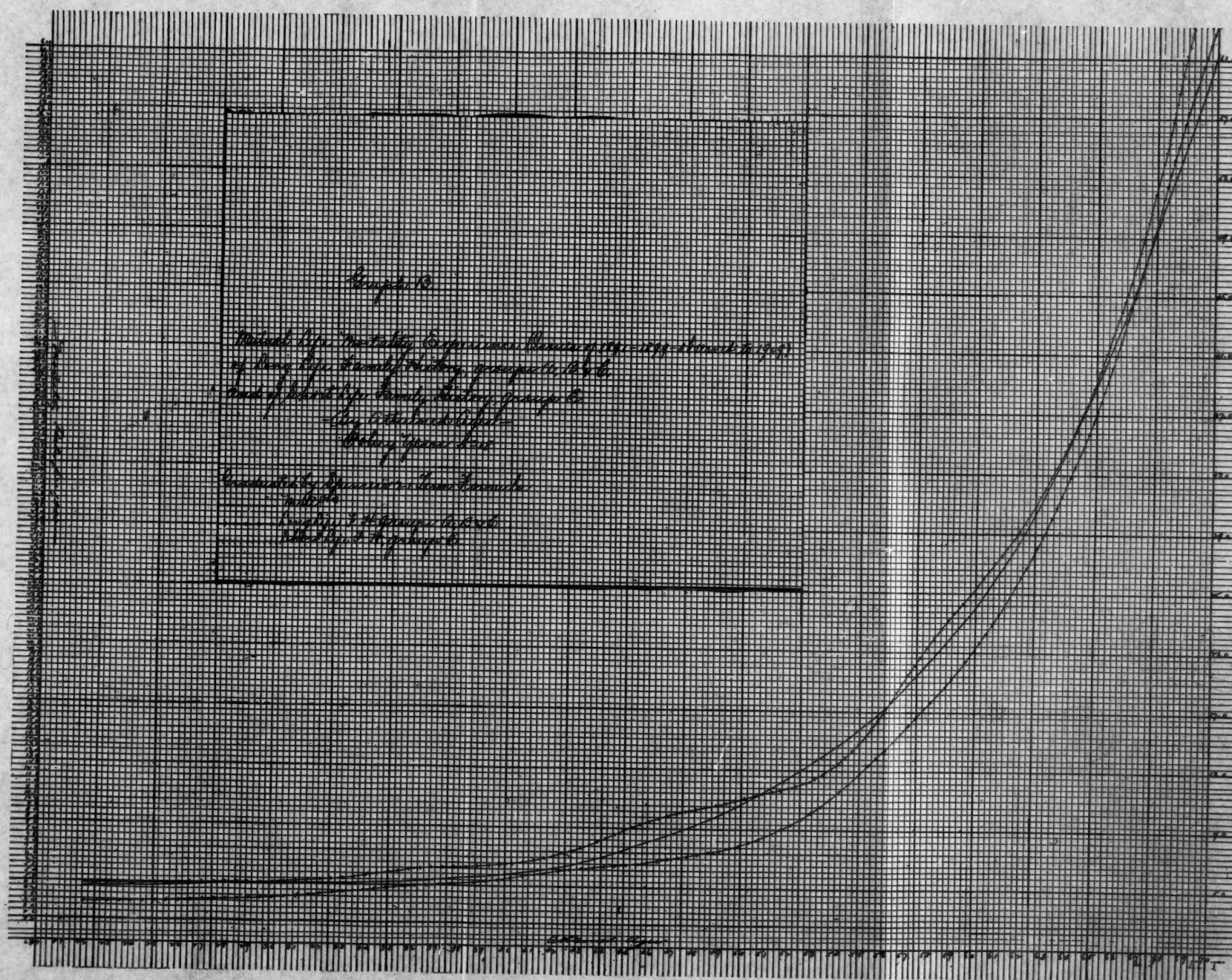




Group 10

Midland Life Insurance Co. of New York  
 of New York family, New York, group 10, 10-10-10  
 of New York family, New York, group 10  
 of New York family, New York, group 10  
 of New York family, New York, group 10

Midland Life Insurance Co. of New York  
 of New York family, New York, group 10, 10-10-10  
 of New York family, New York, group 10  
 of New York family, New York, group 10





has marked demerits and should be eliminated at once in the further consideration of this very important subject. Our standard is and should be the Medico-Actuarial Mortality Table, unless perhaps the New Mortality Investigation will give us a more accurate standard. The word "standard" should not be used in any other way in connection with the selection of risks. Otherwise, this board of experts might say that a given impairment was substandard and, therefore, no standard policy should be issued on the risk. Mr. Hunter, early in the paper, says that different companies have different standards of selection, some rigid and some lax. Here, the word "standard" is used in quite a different sense. For many reasons let us drop the word "standard" and let us insist that the experts who may pass in final judgment upon the significance of impairments, express their findings in terms of a mortality table. Each one of us then can determine for his company whether the risk should be admitted and upon what terms.

So far as the Mutual Life is concerned, we will be very glad to contribute freely our own experience in the effort to secure accurate ratings. I can say for myself and for the other members of the medical staff of The Mutual Life, that we will be very glad to give any time or any work that may be desired. I know that our Executive Officers are interested and I have no doubt that our Company will gladly bear its quota of reasonable expense if there be any need for such.

Dr. Wells—We should like to hear from Dr. Dwight in further discussion of the paper.

Dr. Dwight—Mr. President and Gentlemen: When Dr. Wells suggested that I should take part in opening the discussion of this paper, I hesitated for a week or two before I answered the letter. I thought I differed materially with the ideas of Dr. Rogers and Mr. Hunter, and those of you gentlemen who have met them know that it requires a good deal of self-confidence to differ with their ideas. Certainly those of

us who have been associated with them as intimately as I have might well hesitate for a week or two before they start out to differ widely with them on points to which they have given serious attention. I plucked up my courage, however, and made up my mind what I should say, and then Mr. Hunter took all the wind out of my sails by saying that the paper gave a wrong idea, and it did. I confess that this is the first time I have got clearly in my mind what Dr. Rogers and Mr. Hunter were driving at, although I have heard them make this or similar suggestions before.

I wish to say that I agree entirely with their idea as now expressed. I believe that the work is a difficult one and that it will take a great deal of time, thought, and effort to do it as it should be done. I believe that if the first effort can be made along the lines which have been suggested—Build and Family History—that it will give the Association something that is worth while. I think that perhaps Build is the simplest and perhaps the most important, as it enters into every case, and Family History, one of the most difficult, and that if these two subjects can be handled accurately and satisfactorily the Committee will have demonstrated its ability to furnish workable ratings on any subject which may be referred to it.

One advantage of that work is that it will bring the Actuarial Society and the Medical Directors' Association into even more intimate contact than have the past five years. Those of us who have been on that committee appreciate the many advantages of Mr. Lunger's suggestion of general meetings of the two Associations. The details of the plan must be worked out.

I think that if Dr. Rogers or Mr. Hunter have the remotest idea that as the result of this work we are all going to reach the same or similar conclusions in regard to any individual case, they will be very much disappointed. As the points of view of the Medical Officers vary, so will the action of any individual company vary in connection with risks.

The mortality of any class of risks is not a definite one as



applied to the individual, but is the mortality of the particular group which has been investigated, and that mortality will depend very largely upon the way in which the group was selected. That selection varies with each Company. Our points of view vary, and the mortalities, while similar, will vary.

I am going to steal a little of Dr. Blakely's thunder, as an example because I think Dr. Blakely is going to speak of the experience that we have had in two groups, each one of which I think would be rated by this Committee as substandard, or, as we object to the use of the word "standard" and I rather agree with that, the mortality would be over 100% of the M. A. table. These two groups are albumin, or albumin and casts, and sugar.

In our Company, which does not knowingly take substandard risks, we have recognized them as impairments and yet we have not wished to decline to insure them or to send all of them to those companies doing a substandard business. We thought we would like to take the good ones for ourselves.

During the period covered by Dr. Blakely's paper, the general mortality of the Company was about 48% of the American Table. We accepted certain selected cases with a history of albumin, or albumin and casts, and on that group after selection our mortality was, as I remember it, 45 to 46% of the American Table—that is, a little lower than our general average. Of all the cases that presented themselves with such a history we accepted about two-thirds.

In our last investigation we found that our cases with a history of sugar had given us a mortality of 200% of the American Table, or about three times our general experience. We were somewhat disturbed by this, and proceeded to select them a great deal more strictly. I do not know whether we declined 90% or 95%, but we declined most of them, and on the sugars which we have taken during that period, we had a mortality of about 19%, or about one-third of our general mortality. In other words, we over-selected, so that in our own Company, with different methods of selection,

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our experience in taking cases with a history of sugar has varied from 200% to 19%. Of course the 200% extended over a longer period of time.

I do not believe this work of the Committee will bring us all together. There would not be any fun in the business, our positions would not to me be worth holding, if we were compelled to follow one rule. I do believe, however, that it will put in the hands of the Medical Directors a measuring rod, that it will be something to start with, something extremely valuable and something as little influenced by personal selection as is possible for us to obtain. I hope that that Committee will be appointed, and I know that whoever is on the Committee will have a bully time, will learn a lot, and will come back as enthusiastic over getting together with the Actuarial Society as we were who have served during the past few years.

Dr. Wells—The question is open for discussion. Is there anything further to be said on the subject?

Dr. Toulmin—I would like to speak for a few minutes along the lines of Dr. Dwight's remarks at the meeting a year ago, in reference to the advisability of each Company tabulating its own experience, in the various classes. We cannot overestimate the value of the M. A. report; but its value will be doubled to a Company which knows its own mortality experience with which to compare it. A Company knows how it selected the cases which make any one class, but it does not know the basis of selection of the other forty-two Companies. Let me take, for example, Class 1—Syphilis. You will recall that the M. A. report showed the following mortality percentages:

Group B	139
" C	174
" D	217

We thought for many years that we were selecting these individuals with such great care that we would have a satisfactory mortality. Even the warning of Dr. Dwight and

others, and the M. A. experience, did not convince us of our error. We had selected the cases with such extreme care, we felt sure we would come out all right, but a study of our own super-selected risks, showed that our mortality was 137.5% on the basis of the M. A. table. We were convinced of the error of our ways and have completely reformed. We decline all applications in which there is a personal history of syphilis. We shall find, I am sure, the greatest satisfaction in thus being able to compare our own results with those of the M. A., in each and every class, and obtain results of the greatest value, even though our groups be made up of comparatively small numbers. Monumental as the M. A. report is, it is not complete, but the careful study of its own experience by each Company will surely help to make it so.

Dr. Fisher—Mr. Chairman and Gentlemen: Along that line I would like to ask Mr. Hunter if the Medico-Actuarial Committee took the mortalities of different Companies. It seems to me that with the work that this Committee is going to do that would be very valuable. Our Company had all of the cards returned and we went over the list of impairments that were sent to the Committee and selected those we thought we had enough of to get value from, and we vary greatly in many of these from the data that was prepared by the Committee or the result.

For instance take that class, 19 and 20, I think it was, where there was a history of intemperance at different periods prior to the acceptance of the risk. Well, our Company got a mortality of former intemperance reformed without treatment, of 103 of the M. A. table, as compared with 140 of the Actuarial report. We had 14,155 exposures, with 2298 policies, 103 expected deaths and 99 actual. The same with excessive weights. Our mortality is just 17 points lower than the aggregate mortality of all the heavy-weights—that is, from 35 to 85 pounds over the maximum. Also in a large number of different impairments of occupation, and medical impairments, there is a considerable difference in the selection. And now the question is, how the Committee can pre-



pare a standard that will satisfy all of the Companies as we are working along different lines. In one Company the borderline risks are very different from another Company. Take, for instance, proprietors, superintendents, and managers of hotels, not tending bar. We had 1120 policies with a mortality of 106, and the Actuarial mortality was 135. Now take the mortality of those who are taking treatment for inebriety, while we only had something less than four hundred cases, we were one point better than the Actuarial report. I think, therefore, that if all of the Companies would take their mortalities on the data that they sent to the Committee, they would be in much better shape to make the selection according to their Company's ideas, than if this were done on the whole work of the forty-three Companies.

Dr. Wells—If there is no further discussion, I will ask Mr. Hunter to close.

#### MR. HUNTER—CLOSING DISCUSSION

Mr. Hunter—As Dr. Rogers is not with us, you will have to consider my remarks as expressing my opinions alone.

In the first place I wish to thank Dr. Symonds for his very carefully prepared criticism of our paper, and also the other medical directors for their courtesy in discussing it.

I had not realized until the discussion of to-day that our paper might create a false impression. There was no intention on the part of Dr. Rogers or myself to ask the adoption of the numerical methods of the New York Life. Both of us feel that a committee of medical directors and actuaries should be able to produce a better method than that in use in the New York Life. The reference to our practice made it easier to explain our position. All that we ask is to have committees appointed to consider this matter on any lines which would be of the greatest advantage to our business.

Another misunderstanding has evidently arisen with regard to the use of the word "standards." By that it was not intended to cover a mortality table like the American or the

M. A. Select Table, but sets of mortality ratios similar to those appearing in the study of overweights in Volume II of the Medico-Actuarial Report. It is evident that the same nomenclature does not apply in all offices,—otherwise there would not be such a misunderstanding.

The question of what mortality table is used in the different companies to determine the relative value of risks is not a serious obstacle in the proposed work. If one company informed me that its measuring rod was a modification of the American Table, and another company that it used the M.A. Select Table, and that in both these companies the mortality in a certain group of risks was 125%, we would then know that the mortality was approximately 25% in excess of each company's experience on normal risks.

It is not likely that all companies would adopt a set of mortality ratios, even if produced by the ablest medical directors and actuaries. There must be differences of opinion and different methods of conducting business which influence the action of the officers of the various companies. Any such set of ratios, therefore, would be merely a guide, which could be followed or not as the management of the company might decide. These mortality ratios would express the opinion of able men in the profession, but individual companies might expect to have either better or worse results, depending upon features peculiar to their method of selection and of doing business. No company should be asked to abide by such a table in its office practice.

The question raised by Dr. Symonds of preparing a table of mortality which would consider as the normal weight the point where the lowest mortality appeared, was considered very carefully by the committee of the M.A. Investigation. It did not seem to us practical to prepare such a table, but it was quite possible to do so at that time. It seems to me that it would only cause confusion to suggest a different method of handling a Build Table to that previously in use. Furthermore it seemed proper to give the companies the mortality based upon the average weights in the companies as a whole, allowing

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each company to prepare a table therefrom, which would consider the normal or average weight the point at which the lowest mortality appeared.

Dr. Symonds has also raised some interesting questions regarding the method of rating family histories. This is a subject which alone would make the appointment of a committee worth while. A careful reading of the statement by Dr. Rogers and myself shows that we did not state the difference in mortality between a very poor and a very good family history. We stated that in the application of our numerical methods the assumption was made that there would be a difference between the poor and the good family history.

Dr. Dwight referred to one of the subjects which will call for very careful study,—namely, the effect of selection on the mortality. A company which accepts only standard risks and is increasingly severe in selection with the departure from the normal weight would have a different mortality among overweights than a company which accepted substandard risks and did not make a selection on the foregoing plan. Furthermore, the latter company would have a selection practiced against it by the insured, all of whom would have the option of taking a rated-up policy, which would probably result in a larger percentage of the poorer than of the better risks accepting the contract offered by the company.

Dr. Toulmin strikes the keynote of success in connection with the proposal made by Dr. Rogers and myself. If the principal companies have prepared their own experience and will put it in confidence into the hands of the committee, we would be able to do a far better piece of work than would otherwise be possible.

I am sure that Dr. Rogers will be pleased to hear of the cordial reception which our joint paper has received.

Dr. Wells—The next paper on the program deals with a subject of importance to every Medical Director, to every Medical Department, and to an Association like this. We have tried to bring into our program this year questions of very practical importance and interest to us, and I am sure

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that if in the papers to follow there can be brought out some idea of a better way to obtain better and more careful medical selection from the examiner in the field, it will be a matter that will add greatly to our usefulness. I have asked Dr. Ward, Medical Director of the Mutual Benefit, who has had a long experience along this line to present this paper.

### THE BEST WAY TO OBTAIN BETTER AND MORE CAREFUL MEDICAL SELECTION FROM THE EXAMINERS IN THE FIELD.

BY WILLIAM R. WARD, M.D.,

*Medical Director Mutual Benefit Life Insurance Co.*

This question is constantly engaging the attention of the Medical Directors of every Life Insurance Company. As we approach the subject, three lines of thought are suggested.

First: The selection of our Examiners.

Second: The education of our Examiners and the methods employed to increase their efficiency.

Third: The protection of our Examiners.

It is self-evident that we cannot procure good results from incompetent Examiners. If our primary selection is inferior all of our efforts at training and development will be only partially successful, and the service rendered will be unsatisfactory.

We must also bear in mind that a careful primary selection of Examiners is not of itself sufficient to produce good results. Many competent and skillful physicians have a very meager and inadequate knowledge of the requirements of a Life Insurance Examiner, and upon us as Medical Directors rests the responsibility for their training and development.

Let us first consider the selection of our Examiners. If we, as Medical Directors, had an intimate acquaintance with all of the physicians of our country; if we knew not only their character, their acumen, and their diagnostic skill, but also

their interest in this particular line of work, their desire to coöperate within reasonable limits with the Company's Agents, and their willingness to sacrifice their convenience when necessary—if as Medical Directors we knew all of these things, our task in selecting Examiners would be very simple, and the complaints from trustworthy Agents would be very few. Unfortunately, these conditions do not, and cannot, exist, and consequently we must resort to other methods in our selection.

Without attempting to compare the relative merits of the various methods pursued by the different Companies, it may be of interest to the Association to recite the experience of the Mutual Benefit in this difficult task. For many years we employed State and District Referees. These men were physicians of eminent standing; they held important and responsible positions in National, State, and County Medical Societies, and were recognized as the foremost men of their profession in their respective localities. As a rule the physicians selected by them for our Examiners were men of education and good professional standing, but unfortunately, the necessity of selecting men who had both the time and inclination to render a prompt and coöperative service was very frequently ignored, and consequently we were constantly receiving complaints from our Agents, and requests for changes and reappointments.

In July, 1910, we discontinued all State and District Referees, and entrusted to the Company's General Agents the responsibility of nominating Examiners. These nominees were to be submitted to the Medical Department at the Home Office, whose duty it would be to carefully investigate their qualifications for the position. This investigation was to be made by direct correspondence with several nearby Examiners, and by reports from mercantile companies.

Nearly 5000 Examiners (4812) have been appointed by our Company since this method was adopted, and as a class, they compare favorably with the physicians selected by our Referees.

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I am aware that there are objections to this method. A layman's estimate of a physician's qualifications is not always correct, and if the primary selection is below standard, no amount of care in procuring references will give us a select group, but it is fair to say that after a trial of over six years, there is no disposition to return to the former plan, and the number of complaints because of inattention and indifference has been very greatly reduced. One of the most marked advantages of this system is the responsibility that is imposed upon the General Agents for a high order of medical efficiency. This trust has been creditably performed, and a spirit of co-operation has been created between the Agency and the Medical Departments that is most wholesome and beneficial.

In passing upon a physician's fitness for the position of Examiner, the question of his medical education is vitally important. It is quite obvious that we cannot confine our Examiners to graduates of colleges enrolled under "Class A" but certain institutions masquerading under the name of medical colleges are so woefully deficient in the fundamental branches of medicine, that we cannot hope to procure suitable Examiners from their graduates.

The Carnegie Foundation for the Advancement of Teaching has rendered both the medical profession and the public a most valuable service by its important and exhaustive investigation of the medical colleges of the United States and Canada. Permit me to give a single illustration from their report.

" (BLANK) Medical College. Organized, 1879.  
Attendance 9.  
Teaching staff 27. Professors 26.  
Resources \$1060 annually.

### *Laboratory Facilities.*

The school occupies a few neglected rooms on the second floor of a fifty-foot frame building. Its so-called equipment is dirty and disorderly



beyond description. Its outlay in anatomy consists of a box of bones, and the dried up filthy fragments of a single cadaver. A few bottles of reagents constitute the chemical laboratory. A cold and rusty incubator, a single microscope, and a few unlabeled wet specimens form the so-called 'equipment' for pathology and bacteriology.

*Clinical Facilities.*

There is no Dispensary and no access to the County Hospital."

It is quite evident that no amount of experience can develop a properly qualified Examiner if his early training has been limited to an institution such as this.

It may be of interest to you, gentlemen, in passing, to mention the great improvement that has just been made in one institution. I recently met a number of gentlemen connected with the Vanderbilt Medical School. Three years ago there were in Nashville three medical colleges, and their graduating classes averaged one hundred, so that in Nashville they were graduating three hundred medical students annually. At the present time there is but one medical school. Two have been entirely eliminated by improvements in requirements. There is but one medical school, connected with the Vanderbilt University, with a graduating class of thirty, so that instead of having three hundred graduates we have thirty. In Knoxville they had a medical school which has been disbanded, one or two in Chattanooga which have been disbanded, and one medical school in Memphis, as against two before, so that you will see the improvements that have taken place because of the higher requirements of medical education.

In addition to the requirement of a competent medical education, it is our opinion that an Examiner should have at least three years of private practice. As we recall our individ-



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ual experiences we realize how distorted was our vision when we first left the classroom, and how much we acquired from the hard knocks that came to all of us during the first months and years of our medical work. Without having had this experience, we could not have rendered the Life Insurance Companies a satisfactory service.

We also believe that the younger men, who have had a sufficient amount of private practice to give them good judgment and self-reliance, are more desirable than are the older graduates.

I think this is particularly true of the rural districts, as I have gone through the States of Kentucky and Tennessee. There are comparatively few rural physicians of fifty years or over who are really competent medical examiners. The competent examiners are men who are under that age.

These young men have had the advantage of modern medical thought, and have been trained in methods of diagnosis which are quite unknown to many of their seniors. By referring to the Transactions of our Association, I observe that this subject was considered at the Sixth Annual Meeting, at which time Dr. Curtis presented a paper entitled: *The Medical Examiner—His Selection, Appointment, Instruction, and Employment*. In discussing this paper Dr. Rogers stated that the policy of the New York Life was to appoint young physicians. It made no effort to secure the services of distinguished physicians in the larger cities, as it was felt that these men were too busy with other work to give medical examinations the proper attention, and, while their judgment of risks was undoubtedly the best, it was impossible to be sure that you had their deliberate judgment. He said that the work of the older men did not compare at all with the work of the younger men.

Let us now consider the best methods to train and develop our Examiners, so that we may procure from them the best possible results. In this connection we will consider:

First: The preparation and distribution of a Book of Instructions.

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Second: The distribution of bulletins, charts, circular and personal letters from the Home Office.

Third: Personal visitation by a Medical Director or some other representative of the Company.

Every Medical Examiner should carefully read the Book of Instructions which is prepared for the express purpose of giving to him a clear idea of the medical work required, and the way that the Company desires it to be performed.

This book should be read not only at the time of his appointment, but the Examiner should refer to it frequently so as to keep constantly in mind the Company's standards and requirements. Unfortunately, only a small proportion of our Examiners seem to avail themselves of this means of instruction. It is probable that in many instances when the book is received the first few pages are carefully read, and the balance of the book is rather hurriedly glanced at. Then it is laid aside, and is soon buried beneath the débris which accumulates in the offices of too many physicians. It would be interesting to know how many of our Examiners, who received their appointment five or more years ago, could at this time find the Book of Instructions.

This fact is so well known, that nearly one half of the Companies who responded to Dr. Tiemann's inquiry on this subject stated that they had entirely discontinued the publication of such a book. One of the Medical Directors stated: "We are convinced that the Books of Instruction are entirely wasted. Examiners put them in a cubby-hole or wastebasket them; or if they do keep them they neglect afterwards to consult them."

I believe that the Book of Instructions is a valuable aid to our Examiners, and even if it is neglected by many, it is advisable to continue its use for the benefit of those who read and profit by it, but it is all too evident that this book of itself is entirely insufficient to meet the need.

The preparation and distribution of circular letters, charts, and bulletins is exceedingly valuable. These letters should be concise and definite, and may cover a wide range of subjects.

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Many of the Companies are now availing themselves of this opportunity for the dissemination of valuable and helpful information, and the articles are excellent.

If the Company's Examiners are paid direct from the Home Office by monthly draft, these letters may be enclosed with the draft, thus eliminating the expense of postage, and the work of addressing separate envelopes. All of the active Examiners can be reached by this method.

In many instances the value of these letters will be greatly increased by an accompanying chart or diagram. Such a picture will often remain in the Examiner's mind much longer than would the letter without the illustration.

Apart from the circular letter, it is advisable to correspond freely and frequently with the individual Examiner. If he has rendered a service of particular merit, it requires but a few moments to commend him for it, and he is much more likely to repeat such a service should a similar occasion arise. If he is becoming careless in his work, it is well to admonish him, and to let him know that the Company is observant of details. If we were to carefully review our records we would find that hundreds of our Examiners almost invariably report a pulse rate of 72, and a specific gravity of 1020. These Examiners rarely find any impairment. Such a uniformity in these particulars usually indicates a lack of care and thoroughness in other respects, and a personal letter of admonition should be written.

As we Medical Directors pursue our daily task from year to year, we realize constantly the desirability of cultivating a spirit of comradeship with those members of our profession who are acting as our Examiners. Such a relationship will develop in them a desire to render the best possible service, and will produce the highest order of fidelity and efficiency. If this spirit exists, we will procure from them much valuable information which is not called for on the blank, and we may call upon them for additional service, when such is required, with the full assurance that it will be cheerfully and faithfully rendered.

The work that we may accomplish by the means of bulletins

and personal letters is still incomplete, until we can know our Examiners by a personal interview. This is probably our most valuable method of increasing the efficiency of our service. It is, of course, impossible to personally meet all of our Examiners, for many of them live in remote sections far distant from the lines of transportation, but it is possible for us to know the Examiners whom we employ in our important centers, and from these physicians we can procure definite and valuable information concerning all of those whom we cannot meet face to face.

A visit of this kind enables us to form an estimate of an Examiner's standing and ability which cannot be acquired in any other way. By the very nature of his surroundings, the condition of his office and laboratory, and his personal appearance, we soon learn to know whether or not our Examiner is a man such as we desire. If we find that all of the books on his shelf were purchased soon after his graduation, and if no recent medical periodicals are in evidence upon his table, we may be well assured that he is living in the past and not in the present. If we view his chemical outfit and find some dirty test tubes in a cigar box, and some reagents in unlabeled bottles, we cannot wonder that he never finds either albumin or sugar in any of his cases.

A few leading questions will soon confirm our observations. It is a lamentable fact that many members of our profession are addicted to liquor or drugs. It is exceedingly difficult to learn of these habits by correspondence, but by a personal visit in the field we will frequently receive a clue that certain of our Examiners are victims of these habits and further inquiry will too often confirm these suspicions.

We can, upon these visits, offer some suggestions as to blood pressure, or other important subjects that will be of permanent value to the Examiners, and we can explain to them why certain classes of risks are undesirable, and consequently uninsurable. More than all, we can create a wholesome relationship between the local Examiner and the Home Office which will be simply invaluable.

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*The Protection of Our Examiners.*—Possibly this is our most difficult task. If an Examiner is faithful and efficient and prompt and responsive, it is our duty to protect him, and to hold him secure in his position. Too often is pressure brought to appoint an unnecessary number of Examiners, and consequently those who have served us faithfully are deprived of the work that is rightfully theirs. This is an exceedingly difficult task to regulate, and calls for our best judgment.

Our Agents must be supplied with a sufficient number of Examiners to enable them (our Agents) to perform their task without the embarrassment and danger of undue delay. Furthermore, it is not unreasonable for them to expect from the Examiners a helpful coöperation.

If the Examiner has faith in the Company that he represents, he should be an asset to the Agency and to the Agent, rather than a liability, for a kindly word from him at an opportune moment will frequently be of great service in procuring a desirable applicant, or in increasing the amount of insurance under consideration. On the other hand, his fidelity to duty should be protected, and the Company should not permit him to be displaced because of unconfirmed statements as to his shortcomings.

I believe that the same cordial spirit of coöperation which we as Directors are endeavoring to cultivate toward our Examiners should exist between our Examiners and our Agents, and if both are loyal to the Company and true to themselves, there need be no sacrifice of honor, nor any jeopardy of the Company's interests. Our Examiners should always bear in mind the fact that they owe allegiance to the Company—that they are the Company's advisers and protectors, and that the Company rightfully expects a loyal and efficient service. We cannot reasonably expect such a service unless we assure them of our support, and extend to them the same measure of protection that we expect to receive from them.

Believing that we might procure many practical and valuable suggestions upon this subject from our Examiners, I have

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corresponded with 200 of them, requesting an expression of their opinion. Responses have been received from 80, and their suggestions and ideas are exceedingly interesting and instructive, and cover a wide range of thought. These suggestions may be grouped under the following headings:

1. The Examiner—His Selection and Qualifications.
  2. The Examination of the Applicant.
  3. The Relationship between the Examiner and the Home Office.
  4. The Relationship between the Examiner and the Agent.
- Under the first heading we have the following expressions:

### "THE EXAMINER—HIS SELECTION AND QUALIFICATIONS."

*(Figures indicate number of physicians who made suggestion.)*

- (a) Concentrate the work by limiting the number of Examiners..... (11)

"The more work an Examiner has, and the more pay he receives per annum, the more does he value his position, and the more responsibility does he feel toward the Company."

- (b) Appoint only hospital graduates..... (3)  
(c) Select internists rather than specialists..... (2)  
(d) Select physicians who have had several years, experience in private practice..... (4)  
(e) Procure Examiners of a higher standing..... (7)  
(f) Employ "Life Insurance Specialists"..... (2)

"The Examiner should be made to feel that he is really a part of the Company—that the Company has full confidence in him, and his opinion, and that he has full confidence in the Company: that in the Medical Department are a group of men who are his friends, whose views, interests, and aims are one and the same with his."



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"The best way to obtain better and more careful medical selection from the Examiners in the field is to make better and more careful selection of the Examiners."

### "THE EXAMINATION OF THE APPLICANT."

- (a) Insist upon a quiet room..... (19)

"A good examination cannot be made in the back end of a store or machine shop, or any place where the surroundings are not fairly select."

- (b) Strip the applicant to waist..... ( 6)  
(c) Procure more accurate family history..... ( 5)  
(d) Have a proper room at every Agency with scales and chemical equipment..... ( 3)  
(e) Removal of corsets in examining females..... ( 2)  
(f) Examine pulse and blood pressure both before and after exercise..... ( 1)  
(g) Send urine to Home Office for examination..... ( 1)  
(h) Avoid undue haste..... ( 3)  
(i) Be courteous at all times..... ( 2)  
(j) Realize that diagnosis is the real science of medicine..... ( 1)  
(k) In advising the risk bear in mind not only applicant's condition now, but what it will be 5—10—15 years hence..... ( 2)  
(l) Take the temperature..... ( 1)  
(m) Be prompt in keeping appointments..... ( 2)  
(n) Make special inquiry as to condition of wife's health and number of living children (syphilis). ( 1)  
(o) More thoroughness in physical diagnosis..... ( 2)

"State all important facts and omit unimportant details."

- (p) Include pupillary and patellar reflexes..... ( 3)



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### "THE RELATIONSHIP BETWEEN THE EXAMINER AND HOME OFFICE."

- (a) Have a Medical Director or representative of the Company visit the Examiners in the field. . . . . (17)
- (b) Have a more personal knowledge of the Examiner (2)
- (c) Have Medical Directors attend medical conventions. . . . . (2)
- (d) Have a Medical Director attend Agency meetings (1)
- (e) Have a course of lectures on life insurance examinations in every medical college. . . . . (2)
- (f) Have Examiners appointed by Medical Director. . . (5)
- (g) Send bulletins to Examiners. . . . . (5)
- (h) Avoid "combination" examinations. . . . . (2)
- (i) Keep a record of the work of each Examiner. . . . . (2)
- (j) Have Examiners come to Home Office for a course of training. . . . . (1)
- (k) More personal correspondence. . . . . (1)

"If the Medical Board would send a personal letter to the doctor each time one of his cases is declined, giving the reasons for the declension, it would be of considerable educational value."

### "THE RELATIONSHIP BETWEEN THE EXAMINER AND THE AGENT."

- (a) Protect the Examiners from disgruntled Agents. . . (3)
- (b) Have Examiners independent of Agents. . . . . (3)
- (c) Have a better selection of Agents. . . . . (3)
- (d) Send reports to State Agents instead of local Agents (1)
- (e) Send reports direct to the Home Office. . . . . (6)

"The able Examiner is not always the most popular."

Dr. Wells—This presentation of the subject I am sure will do a great deal of good We will now open the discussion of this paper by hearing from Dr. Tiemann on a line equally important—"The Best Way to Get an Examiner to Use the

Sphygmomanometer." These papers will then be further discussed to-morrow morning.

DISCUSSION OF THE PAPER ON "THE BEST WAY  
TO OBTAIN BETTER AND MORE CAREFUL  
MEDICAL SELECTION FROM THE EX-  
AMINER IN THE FIELD."

ADDITIONAL REMARKS: THE BEST WAY TO GET AN EXAMINER  
TO USE THE SPHYGMOMANOMETER.

BY PAUL E. TIEMANN, M.D.

*Medical Supervisor, New York Life Insurance Co.*

A great deal more is required now of the Examiner than when I took up insurance work twenty-six years ago, and the education of the Examiner demands an ever-increasing amount of our attention. Believing that it would be both helpful and interesting to know what the different Companies are doing to attain this end, I addressed six questions to the Medical Directors of the Association, and I will present their replies as briefly as possible.

*Question 1.*—Do you still issue instructions to your Examiners in book form, or do you do this by means of special letters, blanks, diagnostic charts, etc.?

Of the thirty-six Companies from whom replies were received, nineteen still continue to use the books of instruction, while the remainder have discarded them, having come to the conclusion that the other means are better. Thus they write: "Books of Instruction to Examiners are rarely referred to by them." "The Examiners do not as a rule read the Book of Instructions." "We are convinced that the Books of Instruction are entirely wasted: Examiners put them in a cubby-hole or waste-basket them; or if they do keep them, they neglect afterwards to consult them. Special letters, blanks, diagnostic charts, individual criticisms produce the best results." "Books of Instruction are read rapidly when

received, and are rarely referred to again. Special letters, instructions on the back of the examination blank are of more practical value." Another writes: "Books of Instruction, blanks, and charts are not so likely to be read as special letters." Still another: "We did formerly issue Books of Instruction but decided they did less good than personal letters; we send these letters on any subject in which we feel the Examiner needs special instruction. We also at times send reprints covering the matters in question."

Two Companies state that their medical blanks contain short instructions to the Examiner. I presume that the leaf on the analysis of urine giving the four simple tests for albumin and sugar endorsed by the Medical Directors' Association is generally circulated.

The New York Life has not sent books to Examiners for a number of years, having become convinced that other methods were better. Each new Examiner receives a circular letter calling his attention first to the necessity of prompt attention to requests for additional information; to the importance of a careful description of every risk whether standard or impaired, and, lastly, to the fact that a record is kept of the character of his work.

The medical blank contains special instructions on the subject of abnormalities of the nervous system; of the heart and lungs; it also calls the Examiner's attention to the necessity of careful examination of the affected region where there is a history of appendicitis, gastric ulcer, hepatic colic, etc. Moreover, we have blanks calling for detailed information where there is a history of syphilis, of albuminuria or glycosuria, and a "heart blank" when a murmur is found. This heart blank consists of an outline of the thorax with directions for indicating the situation of the apex beat, the location and transmission of the murmur, and also calling for a description of any unfavorable symptoms. On the back is another cut of the thorax, on which the murmurs most frequently found in life insurance examinations are given, their relative locations, together with a brief description of the individual murmurs

We also frequently examine specimens of urine at the Home Office, and the Examiners are advised of the results of the analyses of these specimens. Finally, we have special blanks when there is a history of drug addiction, or of intemperance in the use of alcohol.

*Question 2.*—Do your Medical Officers when on tour of inspection get in touch with the Examiners with the object of giving them instruction and improving their methods?

Almost all reply that such is their practice; some, of course, do more of this than others. One Company holds triennial conventions in which the Medical Officers meet the Examiners, and the usual conferences and instructions are had.

The Medical Officers of the New York Life meet the Examiners in the larger cities, examine applicants with them, and in this way not only observe their work, but often are of assistance to them. Thus, on a trip two years ago, I saw to it that each Examiner in the city I visited understood the auscultatory method of taking blood pressure.

*Question 3.*—Do you employ traveling inspectors who devote part of their time to the instruction of Examiners?

Six Companies have traveling medical inspectors. One replies that the lay inspectors give instructions to the Examiners in matters not strictly medical. The New York Life at present has no traveling inspectors.

*Question 4.*—Or, if you have local referees, do they take part in this work?

Five Companies have such referees whose duties are for the most part to examine applicants in the large cities where they are located, with the aid of assistants whom they select. Some of them also appoint Examiners in the surrounding districts, and review and correct the medical reports from these districts. One reply says: "The Chief Examiners in the larger cities might serve for this purpose," that is, to instruct the Examiners in the neighborhood. Another, "The Chief Examiners occasionally instruct others at the request of the Medical Department." A third, "In the larger cities, we have Chief Examiners who select their assistants and are held

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responsible for the examinations in that place." A fourth, "Sometimes an old and experienced Examiner acts in an advisory capacity." One Company writes: "The Medical Referees are attached to each agency headquarters with their assistants. They have been especially trained at the Home Office, and many of the assistants have also received similar training. The examinations made in New York City with those made by the medical referees and their assistants constitute nearly 30% of the total examinations." The local referees of another Company appoint Examiners, review the Medical Examiners' reports, and occasionally give the Examiners some instruction, either meeting them in town, or making short trips to nearby places.

*Question 5.*—Have you any opinion to express as to the relative value of these different methods of disseminating information?

Four replies give the opinion that traveling medical inspectors would be the most efficient means of educating the Examiner. Six others state: "The best results are from personal acquaintance and personal correspondence." Another, "The best results should be reached by visits and personal instruction by the Medical Officers; next in value, instruction by the medical referees; next, by the Book of Instructions, and finally, by traveling lay inspectors." From another, "The best method is personal contact with the Medical Examiner; next is instruction by capable referees; and last, by special letters." From others, "Local referees, well chosen, would be very helpful." "Traveling referees especially good." "Personal instruction by a representative of the Company should produce the best results. Nevertheless, the field is large, and therefore circulars and pamphlets under these circumstances will be most effectual." "The best and most valuable undoubtedly would be instructions by a medical referee, but the cost of any wide dissemination is almost prohibitive." "Personal visits are the only satisfactory method." "All the methods are good and of great use. It requires a Company with a very large business to keep special

representatives on the road for this purpose." This Director put special emphasis on the personal element in securing efficiency from the Examiner. In his opinion, a great deal can be done in gaining the loyalty of the Examiners by being very courteous in corresponding with them.

To continue, "All have their value. In the country and the small towns, the education of the Examiner is of considerable importance, but in the larger cities, the high-class Medical Examiner is a better diagnostician than the Medical Director or referee because of his wider experience and greater opportunity for study. The Company endeavors to appoint young men who are internists with satisfactory hospital and laboratory training." "Have felt for some time it would be of advantage to have a representative attend the State Medical Society meetings, more particularly from the Home Office; if this is not practicable, then to engage one of the leading medical men of the State to attend and obtain information regarding the standing of the Examiners. Also, when possible, to have the representatives read papers on the subject of life insurance. Perhaps it might be possible to extend the idea to meetings of the County Societies."

One Company has a system which they consider very useful; that is, to send monthly reports to the Examiners of deaths that have occurred a short time after the examination, calling their attention to presumable carelessness on their part.

Two Companies appear satisfied with their methods. One says that their system of education by special letters, having the Medical Officers meet the Examiners when on trips, together with traveling inspectors who give some instruction, is working well. The other reports that the methods employed appear satisfactory. These are—First, special letters governing particular features to which it is desired to draw the attention of the Examiner. Second, personal visits by the Medical Officers when on tours of inspection. Third, the Company has several medical referees, though it does not depend much upon them for the instruction of the Examiners. Fourth, for the purpose of instruction in blood tension technique, it has



circulated the Tycos booklet among the Examiners. From another, "A useful book of instructions is the only satisfactory method of informing Examiners of the wide field of work." The last reply says: "The best method of disseminating information is to go into details regarding certain subjects as they arise. I know it is valuable for a representative of the Home Office Medical Department to make the personal acquaintance of the Examiners, but it is difficult to get the Examiner to realize the importance of the particular question or the special examination until it is demonstrated to him by a special case."

*Question 6.*—Are you doing anything in the way of instruction with regard to the taking of blood pressure, particularly the correct method of determining the diastolic pressure?

Four Companies replied that they issue special instructions and enclosed copies. One is entitled, "Instructions to Medical Examiners in Taking Blood Pressure." The second, "Blood Pressure in Life Insurance Examinations." The third devotes three pages of its "Instructions for Medical Examiners" to the subject of blood pressure, requiring both the systolic and diastolic pressures. All four issue their instructions in clear, practical form with a full description of the technique for taking the tension by the auditory method. Another Company has a circular letter. Two Companies have sent copies of the Tycos "Blood Pressure Manual" to Examiners when they appear to need instruction. It may be that others include the subject of blood pressure in their instructions to Examiners, but they have not called attention to the fact. Another writes: "We are giving special attention to correct diastolic readings, and we also aim to educate the Examiner by means of personal correspondence, good reprints, and special instructions after reviewing the Examiner's work." Says another: "Our blank calls for the systolic and diastolic pressures; Examiners receive educational letters and circulars; incorrect and inaccurate pressure readings are criticized." Another, "We are making strenuous efforts to receive diastolic as well as systolic readings, and to have these correct by frequent



personal instructions and letters; instructions are sent to new Examiners. Have not insisted upon the diastolic pressure being in the blank until it can be correctly read by all Examiners." Five Companies endeavor to improve the work of the Examiners in the matter of blood pressure by letters, circulars, and criticisms of incorrect readings. One reply states: "We have done nothing so far except through the medical inspectors to teach the Examiners the correct method of determining blood pressure. While in the main the reading of the instruments is highly satisfactory, there is no question that some of the Examiners need instruction."

The medical referees of one Company have been trained at the Home Office, and they in turn train their assistants. Two others give instruction by personal visits whenever the opportunity presents itself. Eight Companies report they are doing something to instruct the Examiners, though nothing very special, while ten others are not doing anything in this line. One says: "We do nothing except in individual cases." Finally, one Director writes: "We are not making any attempt to instruct our Examiners regarding the taking of diastolic blood pressure. I believe that the majority of life insurance Examiners have the idea that they know how to take diastolic readings as they have read the circulars sent out by the different manufacturers. It seems to be difficult to instruct physicians as to the method of taking diastolic readings without making a practical demonstration." He then describes a visit from an Examiner, a leading physician in a fairly large city, who had learned to take auditory readings while abroad. He saw there were only a few of the physicians in his city who could take the diastolic reading, and they had learned this from him. The Medical Director gave this Examiner an applicant with a high tension to examine, and found he was unable to make a correct diastolic reading.

At last year's meeting, Dr. Gordon Wilson related his experience with the diastolic readings of the Examiners, having not infrequently received reports where the diastolic and systolic pressures were only five points apart. Dr. Porter

submitted a suggestion by Dr. Phelps that the Association have a form drawn up which could be adopted by the Companies and distributed to the Examiners, instructing them how to take the systolic and diastolic pressures. Dr. Patton, in reply, said that they had been paying more attention recently to the diastolic pressure, and consequently they felt it was time to begin training the Examiners. He read a circular letter signed by Dr. W. A. Jaquith, giving full directions how to take the tension by the auditory method. During the past year, the New York Life has been receiving an increasing number of reports including the diastolic pressures, and while these are generally satisfactory, we occasionally have some which are far from correct. In criticizing these, and in attempting to correct the Examiners' methods, we finally evolved a circular letter, to which reference will be made later. It appears to me we have been fairly successful in improving the Examiners' blood pressure technique. Thus, one Examiner persistently sent in readings such as S. 142—D. 120—S. 142—D. 118 in normal individuals, but after laboring with him for some time, his pressure reports have become entirely satisfactory. Another Examiner, a leading physician in his city, reported S. 130—D. 125. I inquired how he found his diastolic pressure and he replied: "It was a mistake to record the diastolic as 125; it should have been 100. I first ran the index above the systolic point 130, to about 150, and then placed the stethoscope over the artery at the elbow about one and one half inches below the flexure. I lowered the air until the heart-beat was heard, and this was at 100, and as I take it, the diastolic point." Answering this, I explained the auditory method, and asked what he meant by saying he lowered the air until the heartbeat was heard. He answered: "I have again taken the blood pressure; the report should read: 'After lowering the index from the systolic point 130, the pulse is heard by the stethoscope to disappear at 100.'"

In teaching the Examiner to take blood pressure, the main thing in my opinion is to make the instruction as simple and direct as possible, without burdening his mind with a long list

of facts that he can easily acquire later. What we most want of him is a correct reading of the applicant's tension. I have repeatedly been successful in teaching applicants to take their own tension by the auditory method, generally at the first attempt, even when they had never used the stethoscope before. All that was necessary was a clear description on my part, and good hearing and fair intelligence on theirs. This shows that there is nothing inherently difficult in the process, and as soon as this is made plain to the Examiner, he will be emboldened to practice it. Our letter is as follows:

**DEAR DOCTOR:**

Many of our Examiners are realizing the steadily increasing importance of blood pressure observations, and are furnishing us with the diastolic as well as the systolic pressure. A study of the reports from various parts of the country satisfies us that many of those who make blood pressure observations are not employing the correct technique, and we have thought that a statement on this subject of blood pressure may not be unwelcome to them.

The diastolic pressure is the pressure in the arteries during the intervals between the systoles. The systolic pressure is that found in the arteries following the systole of the heart. It is the pressure when the systolic wave is at its height. The difference between the systolic and the diastolic pressure is the pulse pressure, and measures the force of the ventricular contraction. The following table gives the average systolic blood pressure found in a considerable number of observations and shows what is probably the normal blood pressure at each age:

<i>Age.</i>	<i>Average.</i>
20	120
30	123
40	126
50	130
60	134

How widely any given blood pressure may depart from the average and still be within the limits of the normal has not been definitely determined, but it may be accepted as

probable that a variation of about 12%, either above or below the average systolic pressure is still within the limits of the normal. Thus, at age 20, a person's blood pressure may be as high as 134 or as low as 98, and still be within the limits of health. At age 60, a blood pressure as high as 150 or as low as 118 may be accepted as coming within the limits of the normal. The pulse pressure should range from 35 mm. to 40 mm., whatever may be the systolic pressure.

The evidence is steadily increasing that of the three pressures here mentioned the systolic is the least important, and that the value of blood pressure observations depends largely upon a knowledge of the diastolic and pulse pressures. It is therefore important that the technique of taking the diastolic pressure should be clearly understood, and to that end the following suggestions may be of value:

A. See that the applicant is seated in a comfortable chair with a support for the back. Place the cuff around the bared upper arm. Adjust it so that it fits snugly to the arm without constricting it.

B. Inflate the cuff until the pulse has disappeared from the wrist. Apply the stethoscope over the anterior surface of the forearm just below the fold of the elbow and a little to the radial side so as to rest upon the radial artery.

C. Then allow the air to escape slowly from the sleeve, listening meanwhile for the first tapping sound that announces the return of the circulation in the radial artery, and the reading of the instrument at the point where this tapping sound is first heard gives the systolic pressure.

D. Continuing to allow the air to escape from the sleeve, it will be noticed that the tapping sounds become stronger, followed in a short time by blowing murmurs which in their turn give place as the pressure decreases to tapping sounds. These tapping sounds become rather abruptly dull, and shortly thereafter altogether cease. The point at which they become dull, as marked on the index of the instrument, fixes the diastolic pressure.

E. The pulse pressure is the difference between the systolic and diastolic pressure as thus determined.

F. In order to make sure that a high or a low blood pressure is not caused by nervousness, take a second observation after a short interval of rest.

In order to make this subject still clearer, we have made a sketch representing the various phenomena observed when this, the auscultatory method, is employed, and we enclose

it herewith thinking it may be of interest to you. We shall be very glad to discuss this subject further with you should there remain any points which we have not covered to your satisfaction.

Very truly yours, etc.

This letter and the diagram are now being sent to our Examiners. Being curious to know how they impressed the Examiners, I sent copies to several with whom I had previously corresponded on the subject of their pressure reports, and here are two replies:

July 17, 1916.

In reference to your circular letter, I am with you,—think it is the best thing for your country Examiners. It is bound to be a great help to them, as it is to me. Believe you have covered the ground. Any doctor ought to be able with the instructions to make a good examination. I have no suggestions to make.

July 14, 1916.

I was very much pleased with your blood pressure letter. It is a very clear exposition of the subject, and I know of nothing better for giving one an insight into the technique of the procedure. I was slow to make use of the auscultatory method because the usual directions found in the medical books made it look too difficult, but your letter certainly will make it easier for your Examiners to understand it. This method is the most accurate, and it seems to me the only one for the diastolic pressure. I quite agree with you that the diastolic is far more important than the systolic, although many insurance companies ask for the latter only. Your table of blood pressure according to age seems to me to be very accurate. Your chart is ingenious, and I believe it will be a great help in understanding the subject.

The writer of the second letter admits that he hesitated to practice the auditory method because the directions he had read made it appear too difficult.

My experience during the past year leads me to believe that in a relatively short time we shall be able to obtain correct

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systolic and diastolic readings from the great majority of our Examiners. As is always the case with something new, the process of introduction is slow at first, but I see no reason why patient and well-directed effort should not be crowned with success.

### SECOND DAY

Dr. Wells, President, in Chair.

The meeting was called to order, after which the balloting for the election of officers took place. Dr. Patton took the place of Dr. Willitts as teller.

Dr. W. O. Pauli read the following memorial on Dr. Clark W. Davis:

For more than twenty-five years Dr. Clark W. Davis served the Union Central Life Insurance Company as a Medical Director. He succeeded his father, Dr. Wm. B. Davis, who also was a member of this Association, and the first Medical Director of the Union Central Life Insurance Company—father and son having served the Company since its organization in 1867.

Dr. Clark Wasgatt Davis was born in Cincinnati fifty-two years ago, the son of Dr. Wm. Bramwell Davis, who was of Welsh parentage, and Frances Redman Davis, of English and Scotch ancestry.

He was graduated from the Miami Medical College in 1886, and practiced his profession with his father for many years, and for several years was on the Medical Staff of Christ Hospital of Cincinnati. He enjoyed a large and lucrative practice.

He was elected Health Officer of Cincinnati in 1900, which position he held until 1906, and his record as city health official was a great credit to the city.

After having served for a number of years as Medical Examiner of the Company, he was appointed Assistant Medi-



cal Director in 1891, and from 1893 to 1907 he served as Associate Medical Director, when he was elected Medical Director in charge, and had since that year given his entire time to the position.

During his administration he made a number of changes in the practice of the Company in selection of risks, having adopted the contagious theory of exposure to tuberculosis, and discarded the inherited principle of the family history.

He was a firm believer in the importance of careful microscopical and chemical examinations of urine to be made at the Home Office, and established such a laboratory at the Home Office in 1907.

Dr. Davis was a man of firm convictions. There never was any uncertainty about where he stood on anything, and he was admired and loved for his frankness and firmness. He was a cultured, courteous, and noble physician, possessing many striking and endearing personal characteristics.

Dr. Davis was a lover of outdoor sports; one of his chief pleasures was horseback riding. He loved horses, and drove a team of thoroughbred horses daily to his office, and preferred the horse and sully to the automobile. He always looked forward to the annual hunts of the American Fox Hunting Club, which he attended for eighteen years.

Dr. Davis was always a liberal contributor towards charity maintenances and benevolences. He was kind and he was generous. His early death was a great sorrow to those who were privileged to know him personally. He leaves a host of friends who will mourn his loss and who will long remember him with affectionate regard.

Let us remember Dr. Clark W. Davis as a brave, conscientious member of this Association, who was a free thinker in all matters pertaining to Life Insurance Medicine, a man who lived a life of full-measured usefulness to the community.

He was elected to membership in this Association at the third annual meeting held in New York City in 1892.



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Dr. J. B. Ogden read the following memorial on Dr. Clinton D. W. Van Dyck:

Dr. Clinton DeWitt Van Dyck was born in Coxsackie, New York, in 1856. He was one of an old and prominent family of the Hudson River Valley. He was graduated from Rutgers College in 1877, and Albany Medical College in 1879. He was married in 1882 to Frances Elizabeth Birch Fiske. For several years he practiced in Manalapan, New Jersey, coming to New York in 1890. In May, 1890, he became a Field Examiner for the Metropolitan Life Insurance Company and in 1905 joined the Home Office Staff as a Medical Supervisor. He became a member of the Association of Life Insurance Medical Directors in October, 1914. In this he took a great deal of pleasure. Although his membership was brief, he had availed himself of the opportunity to meet many of you, and you will recall his genial nature and his unfailing cheerfulness. All who came in contact with him during his long and faithful service in the Metropolitan will ever remember him as a true comrade, and a loyal friend. He died in Atlantic City, August 10, 1916. He is survived by his widow and a brother, Professor Frank C. Van Dyck of Rutgers College.

Dr. Wells—We will proceed to the discussion of the two very valuable and interesting papers on a subject that is of interest to us all, perhaps more so to some than to others, but it is a question to which I think the Association should give consideration from time to time, as it is of vital importance—the selection of business in the field. Primarily, of course, the agent is the first selector, and then the Medical Examiner, and it is a subject that is of interest to us all, how to get good examiners, how to instruct them, how to educate them. It is of vital importance, and I think we might well consider it in each of our meetings in some form. I will ask that Dr. Merchant open the discussion this morning on these two papers, discussing them together.

## DISCUSSION

Generally speaking, insurance companies distrust their agents, applicants, and examiners. Else why Inspection Departments? The whole business of selection of risks would be much simplified if agents, applicants, and examiners could be entirely trusted. The day may come when that desirable condition will prevail. In the meantime, we must checkmate the dishonest persons in the classes mentioned, endeavoring to work as little injustice as possible to the honest ones who are in the majority.

The Mutual Life uses great care in its selection of examiners and risks. A commercial report made by correspondents appointed by our own bureau is secured on examiners and risks and every risk is inspected by a Home Office inspector within two years of the issuance of the policy. Our medical examiners are nominated by our Medical Referees and by lay inspectors who visit each town while they are making the inspection of risks. We do not encourage suggestions from agents as to appointment of examiners. In *general*, we aim to prevent a *multiplicity of examiners*. We wish and endeavor to secure men with good medical training, who are honest and sober and who will report the facts as regard the applicants whom they examine. The appointment is made directly from the Home Office, a formal notice of appointment is sent to the examiner, he is sent a *book of instructions*, and he is visited periodically by a lay inspector who explains to him the Company's requirements in the selection of its risks, and who, while inspecting risks, if he finds adverse features, goes over the case with the examiner to find out why he did not report them. This I consider of great value. Everyone works better when he knows that his work is being checked up and a periodic visit from a Company representative other than the agent keeps alive a wholesome respect for the rules.

A careful record is kept at the Home Office of each examiner's work on a special card; number of examinations, errors, omissions, and faults are noted thereon. Faults are graded

"a," "b," "c"; the number of faults for the month of June, 1916, was "a," 46; "b," 24; "c," 20; total, 90. In that month the Company received 6484 applications. For the year 1915, the number of faults was 971, divided as follows: "a," 623; "b," 154; "c," 194; an average of 80 per month. The number of applications during the year was 75,065; an average of 6200 per month. We have on our list about 18,000 examiners. In the past year we appointed about 1500 examiners and discontinued about the same number, including those removed and died.

*Our Medical Referee system* which in its present form has existed about twelve years is having a great effect upon the selection of risks and the selection of examiners. We have sixty-three (63) Medical Referees—one for each agency city. The Medical Referees have been carefully selected; they are well trained medically, graduates of good schools, with a full hospital experience. They were picked with especial attention to their tact and ability to handle difficult situations. They were required to spend a month to six weeks at the Home Office in hourly contact with the Medical Directors, examining cases under their supervision and making urinalyses, and received a very broad and comprehensive idea of insurance methods. Other companies enjoy the advantages of this training, because they employ our Referees as examiners.

*Their Duties*—Their duties are to revise applications in the agency office, nominate and correspond with examiners, and release policies sent out subject to medical restraints. They are expected to examine all cases in the city of their appointment for which they are available and examine probably all large cases in the territory. They visit places in the territory to instruct examiners, they examine appeal cases when brought before them in the agency city or in the territory, and, in general, keep a supervision over the particular territory under their charge. All of the large cases and probably about 30% of the risks in general are examined by the Referees or by Home Office medical examiners (about 50% by amounts). This system enables the Home Office to

put a trained man, one who knows all its requirements, and in whose examination they have absolute confidence, in any place in the agency within a few hours, to examine large cases and doubtful cases and to clear up any situations that may arise. The Referees supervise the examiners' work, they attend meetings of the medical societies, and in many cases they lecture on life insurance in the medical schools located in the cities in which they reside. Their affiliation with the medical college gives them an opportunity to keep in touch with young men who are going out to settle in their territory and select the best of these for appointment.

The lay inspectors, competent men, visit the Home Office at frequent intervals and during these visits come to see the Medical Directors and talk over the situation in the field as regard the medical examiners. They are told what the Home Office desires in its examiners and the class of men that are required. They have the Company's book of instructions.

In the appointment of our examiners we have taken advantage of the Carnegie Foundation Reports as well as the American Medical Association book and grading. We notify all examiners of death claims within five years and correspond directly with the examiners when we find that they are not living up to the Company's requirements and its rules. We pay particular attention to the question of the irregular examination and endeavor, as far as possible, to protect the regular examiners. We feel that it is the duty of the Medical Department to increase as far as possible the business efficiency of the examiners and to facilitate the prompt examining of applicants. We feel that much may be done by instructing agents as to the undesirability of certain classes of risks, the disadvantage to them of short term and contested death claims, as well as cancelled policies. In this connection we urge the use of regular examiners and explain the disadvantages of the use of irregular examiners.

For the benefit of the examiners and selection, the medical examination blank should be as simple as possible. I believe that the Mutual Life has one of the simplest blanks, yet there

are 76 enquiries to be made by the examiner, and in case of women the number of enquiries is 84. When an examiner has to put a large amount of time on asking questions and recording the answers, the temptation is to slight the physical examination as it is difficult to hold the applicant and make him submit to the careful physical examination which is so desirable.

It has been suggested that it would be desirable for this Association to compile a book on "How to Examine for Life Insurance," and that this book should be given to each examiner in the United States. A book of this kind should contain all the best methods of urinalysis, an explanation of blood pressure, its meaning and how to take it, general rules on physical diagnosis, heart murmurs, and general rules for examination. It could contain some of the results of the Medico-Actuarial Investigation and should be written in an interesting and entertaining manner. A book of this kind should find its way to and occupy a place on the shelf of every man who examines for life insurance in the United States. Some device could be arranged by which a duplication of the distribution could be avoided and it is probable that a book of this kind could be prepared at a reasonable cost. The last book of instructions of the Mutual Life, which has just been issued, cost between seven and eight cents a copy. (54 pages.) It contains a full method of urinalysis, how to take blood pressure, general instructions for examining, and a very full chapter on heart murmurs, which was taken from the excellent book on *Life Insurance Examining* published by Dr. Symonds some years ago, which he kindly allowed us to use.

Dr. Wells—A very valuable contribution. The next speaker will be Dr. Charles D. Alton of the Connecticut Mutual.

Dr. Alton—Mr. President and Gentlemen: I will endeavor to follow in speaking of Medical Examiners the order set forth by Dr. Ward, in order that we may keep within the bounds of his suggestions.

First, the selection of the Examiner; second, the instruction

of the Examiner; and third, the protection of the Examiner

I might say that the selection of the Medical Examiner has been a hobby of mine for a good many years. My very early experience with the Connecticut Mutual took me into the West somewhat, and I realized that the Companies were depending on very poor work on the part of the Examiners selected by the old methods. That stimulated a thought in my own mind, and I laid it before the Company, and a new method was instituted, which was to have the medical corps in the field under the care and appointed by the selection of one member of the medical staff at the Home Office. We have heard of the method of the Mutual Life which has very many excellent features, but it is the method of a large Company. What I may say may be applied more to those representing the smaller Companies, and the smaller Companies are in the majority. All of the Companies cannot perhaps have Medical Referees in so many of the large cities. Therefore it may be necessary to have one medical man at the Home Office attached to the medical staff there, who oversees all of the Medical Examiners.

Of course there are very many methods of selecting Examiners all the way from the two-cent postage route to that of having a Medical Director or Medical Officer at the Home Office, and the whole range between are the methods followed by all of us.

I refer to the two-cent postage route as the simplest way. When we receive a request from another Company asking if Dr. So and So is our Examiner, we smile and accord them the courtesy of saying that he is, and we feel complimented when we know that that Company has appointed that Examiner, because he is our Examiner. It reminds me of a story told by a minister in my hearing, in a sermon a week or two ago, in which he made request for a Ford automobile. He was from the West, had a wide range of territory in Nebraska, and he commented on the Ford as being the cheapest, and "it gets there." So we can see that the very simple method of selecting Medical Examiners by the assistance of other



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Companies is economical and results in good, so far as the other Company's selection is concerned.

The great point about having a Medical Officer in charge of the Medical Examiners is that it gives him time apart from other duties at the Home Office for visiting the field. Now I happen to have that care in the Connecticut Mutual, but I do not get into the field now as often as I used to. My visits are only occasional, but they are practically the same as the Medical Referee for Chicago or for St. Louis, in one of the very large Companies, going out into his territory. The point is that it keeps you in touch with the Medical Examiners. The Medical Director sits at his desk. He looks over an application. He brings to that application, which may be on the border-line, his own medical acumen, his judicial mind based upon experience of the past. That is one leg of the tripod. He has also the statistics of the Medico-Actuarial Investigations. There are two strong legs on that tripod, but he is dealing with an unknown factor, he is dealing with a Medical Examiner he does not know. There is the third leg of the tripod and a very weak one. You can never have a perfect triangle if one of the parts is missing. Therefore it is necessary in some way to keep the Home Office in touch with the Medical Examiner, and to know something about him. Our Chief Medical Director comes to my desk and says: "Do you know this Medical Examiner? What sort of a man is he?" Well, I happen to know that man is well up in physical diagnosis. Here is a matter of a questionable heart, perhaps, a question whether it is an exo-cardial murmur or a faint mitral lesion. Now the question comes up, is that man qualified to discriminate between the two. I happen to know that he is. I happen to know that another man is up in urinalysis. I know that another man has good backbone and that he can stand up against an agent's solicitations to have a risk pass through easily that ought to be a doubtful one. Those are the results that come from this personal contact, and that is the one thing that is in my mind chiefly, relative to the selection of Medical Examiners.



Then of course there is the matter of correspondence. Now this Medical Officer takes up risk after risk where there seems to be a little deficiency, a little lack of education or of judgment on the part of the Medical Examiner. A letter goes out to him, not a general book of instructions, but a letter on the one particular point on which he seems to be lacking. There, I believe, is the one way by correspondence to educate the Medical Examiner in the field. The Examiner is your man, you take him into your confidence, you write to him. He immediately begins to feel that he is attached to the Medical Department at the Home Office. He is not related now to the agent in the field.

A good deal has been said about medical colleges, in Dr. Ward's paper, and by others, and the remarks by Dr. Merchant, and I do not know that I need to add anything further to that. We are coming to a time when we are going to get men far better educated than they have been in the past. Of course many years ago we had to take the men as they were. I might say that the examinations forty years ago were very much simpler than they are to-day, and in the selection of men we looked to the older man who had experience in the neighborhood, knew all of the family histories, because in those days we depended very much upon heredity. To-day we give heredity a simpler place, a place of less importance, and we depend upon many other things. Therefore we have come to look at the younger man as the more desirable. In selecting Examiners, I always find a hospital interne if I can. There is a man who has had a year or a year and a half of experience immediately after his studies, and it has fixed firmly in his mind the things he has been learning from his text-books. In his daily walks through the hospital, cases come to him, and he studies them. If he were to sit back in his office where he starts his practice immediately after he receives his diploma, he would perhaps sit there, reading novels, getting into rather lazy ways, while he is hoping by some means or other to pay his office rent, and he sees very little business, and by the time he comes into a more active

life he has forgotten a great deal he learned from his textbooks. So I believe that in the matter of physical diagnosis, in the matter of urinalysis, and all of those things that belong to the medical examination, the ex-interne is far better equipped than the man who goes immediately into practice.

There is one thing about this personal contact again, in relation to the medical college. If I look over a man's record and see that he comes from one of the little colleges, within one hundred miles of the Missouri River, we will say, not mentioning names, I know at once that he has simply been to a sort of medical district school. He has not received a college education, and I pass him by. I remember one city in the West where perhaps half the medical population of nearly 200 to 250 physicians has been related to the two little struggling "district school" colleges, so-called, in that town. They are all affiliated with them and I pass by every one of those men. If they are even interested in a school of that kind there is something wrong. I look to the other half. There are perhaps twenty men of various ages in that town who might do as examiners. It is wise to know these things.

The question sometimes comes up relative to those of other schools, homeopaths, eclectics. I remember back in Dr. Shepherd's day, correspondence came to us from the West, and our good doctor was inclined to answer the plea from a homeopathic society, to know if we appointed homeopaths. He was thinking how he would write a letter and he talked it over with me. I said: "Doctor, just write that reply as briefly as you can and say—'Yes, we do.' " He smiled, and said: "How do you make that out?" I said: "I have appointed half a dozen or more homeopaths scattered around the United States, so you can see that we do appoint homeopaths." He wrote his letter and the next publication of that homeopathic society contained the announcement that the Connecticut Mutual is one of the companies employing homeopaths.

I remember going into one town in New York State, and this is where the personal contact comes in. I knew, after I had been there a few hours, every physician in the place, and

I knew considerable about them, and I found that one very good physician was the brother of the agent of one Company. Naturally our agent did not care very much for him. Another one was a very capable man but addicted to bending his elbow too frequently. And so I went on through the list, and I found some objection to every one excepting one homeopath who was recognized by the others as the best diagnostician in the town, and I appointed the homeopath. I select those men if they are the best men in town, but my point is always to get the best physician I can find, and I aim to know a good deal about him, as much as I can discover, and by contrast with my knowledge of the others. I might say the same thing relatively about eclectics.

In the West we have that question to consider a good deal. Oftentimes, our agents write in that they would like to have a certain physician appointed. In looking him up I find he is a surgeon. Now the question comes up, are surgeons good Medical Examiners? From my experience, I should say, as a rule, no. The surgeon, in the same time that it takes to make an examination, makes a surgical operation that gives him a return of from one to ten times as much money. He cannot afford to make an examination for life insurance, and give the company the time that it would take for one of his operations, paying double or more. Again, the surgeon is a man who asks a physician or one of his hospital internes or someone connected with the visiting staff on the medical side to examine a man's heart, lungs, etc., also the urine, before he starts his operation. He gets out of the habit of making diagnoses, that is, of medical diagnoses, and therefore I feel that trusting others in other places, we can hardly trust him in the care that he ought to give in making examinations for us.

I alluded a moment or two ago to the old men and the young men, and I used to hold, as I stated before, that the old men were the better. They had the experience, they had a knowledge of the families of the applicants, but life has changed; our smaller Western cities have increased in size,

the conditions are altogether different, and I find now that our best Examiners are usually the younger men, men I should say eight to ten years out of medical school.

There is one point that I think Medical Directors sitting at the Home Office give little thought to. Those of us who have been privileged to travel about the United States and study the conditions in the various localities find that there is a good deal in the locality. Now you look for a Medical Examiner we will say in the northern counties of Illinois, and there is the influence of Chicago medical schools, and you find most excellent physicians, a high grade of education running through those towns. You will find an excellent condition of morals, religious influences, etc. Now drop down—not to be unkind to Kentucky—say to southwestern Kentucky where one of the physicians of another Company, not knowing how to use a sphygmomanometer, and knowing that the local agent was going over to another town where he knew a doctor had one, asked the agent to borrow that sphygmomanometer and get the doctor to show him how to use it and bring it over and show him and together they put down a reading of the sphygmomanometer, the value of which you can estimate as well as I.

Now there are conditions in localities. We have to exercise very great care in certain localities in the selection of Examiners, and I am sorry to say that even then we do not get a high order of medical ability. Yet of course the Agency Department insists upon our going there. They send their agents in, they write business, and we have to have it examined.

There is one little section not far from the western portion of Kentucky, and this comes to me from personal visits, where forty years ago the people were all suffering with malarial fevers, due to the overflow of the river. There were a great many physicians to treat the many maladies, and, although the population of that section has now increased and agriculture has been developed, open ditches having been run through to drain the whole country, the condition has

changed, malaria has diminished, and there are about half as many doctors to-day as there were forty years ago, and these are, as a rule, poor examiners. Now, I think it is of value to the Medical Director to know something of localities of that kind.

Then again, we find in certain localities a far higher grade of medical education, and if I am looking for an Examiner in Minnesota, we will say, and I find that a certain doctor has been selected by Dr. Fisher of the Northwestern, I am very apt to think that this is a good selection; but if I find down in North Carolina a selection by the Northwestern, I know it is too far away from the Northwestern Home Office to select men with the same acumen as in Minnesota.

Again, in Minnesota, I remember many years ago in my early visits there, I was struck with the school education prior to medical education of very many of the physicians. I found that they were from Eastern colleges, a great many from Maine, Dartmouth men, Bowdoin men, Amherst men, and medical men from Harvard, not only in Minnesota, but westward into North Dakota.

Now in this matter of education by correspondence, I have before me what I call my "pink slip." Looking over a medical examination we find that a physician has a little shortcoming. In our examination we ask the question whether this man is "first class," "fully up to the average" or "doubtful." I do not know how it is with you now as Medical Directors, but there was a time when a good many of you treated your Medical Examiners as medical clerks. You had them ask the questions, but you did not attach much importance to their opinions. We have tried to treat our Medical Examiners differently. We start by trying to get our Medical Examiners into our confidence, we give them our confidence and we look for theirs. We ask them their opinion when they have finished their examination.

A favorable or an unfavorable "pink slip" is made on examinations calling for comment. We put this "pink slip" in what we call at our office a "dossier." I suppose that word

comes from the records of the old Dreyfus trial in France many years ago, at about the time we inaugurated this system. These "dossiers" contain the record of every Medical Examiner in our files and thousands of other physicians. We put this "pink slip" in his dossier. A little later we have another "pink slip" to put in. We take that man in hand by correspondence. We write him a letter and draw his attention to the fact that his conclusions are contrary to medical conclusions in life insurance, and by that kind of correspondence we show him light on the thing that we feel he ought to understand, and by and by we get a Medical Examiner who understands insurance risks so well that he is giving us assistance right along with every examination he makes. Sometimes, before making a new appointment, we have a few first examinations from a man—of course I have assured myself that he is the right man to begin with as far as I can learn; he gives us examinations that show that he does not quite comprehend some of the details of his duties. A few letters may or may not correct this—he is on trial. I know that our Chief Medical Director was rather out of patience with a man that I had selected, but I knew the man, I had met him in his office, I had lunched with him, I knew all about him from my medical friends, and I knew that that man had backbone, he had medical ability, and all he needed was to be shown the way a little because he had a good judicial mind, but he did not know the features that are so familiar to the minds of the Medical Directors at the Home Office with reference to the selection of medical risks. I wrote him perhaps three or four letters. On my first visit to that Western city, I sat down in his office, took an examination, and ran through it, and pointed out the various views that might be taken of answers to certain questions, and to this day that man thanks me for that half-hour talk on medical examinations. Our Medical Director, being discouraged with him in the beginning, to-day regards him as one of the best Medical Examiners we have in the United States. So you see the force and the benefit of education by either direct personal



contact or by correspondence from someone at the Home Office.

I might say to those Medical Directors who send out little blanks asking for information regarding our examiners: When one has a good deal of information about different physicians there is something more than just the fact—is he your examiner, or is he in good standing with you? We get this printed slip inquiring about the standing of a Medical Examiner, and it is signed with a rubber stamp. Now when a man has devoted himself to studying Medical Examiners, and knows a good many things about a Medical Examiner, he does not feel like giving away all of that information to a rubber stamp, and I might say here, if any Medical Director will write us over his own written signature, I can give him some information that will be of value, whereas the rubber stamp brings only the other rubber stamp saying that he has acceptably examined for us. I think that method is one in error. I do not think you get the information you look for, and the information you get is of really very little value. For instance, ten years ago, we appointed that physician Medical Examiner, and since that time, while I have not learned enough to erase him from our lists, I do know enough about him to say to a Medical Director "Don't select him at this time. You can do far better." That would be valuable information to you, but the rubber stamp does not get it. We have not time to answer rubber stamps that way.

As to the education of the Medical Examiner, I might say this as a preface, that the Medical Examiner is like the poet, he is born and not made. The great point is to select a medical man who is born a Medical Examiner, and if we look the field over, we come to realize that the stork is not especially prejudiced in favor of insurance companies. Therefore there are few Medical Examiners by nature. Realizing that fact, we have to take the best men we can find and instruct them as we go along. We have not found that manuals of instruction are of much value. In going into the office of a doctor, I frequently find that the little manual we sent him



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is tucked away in a pigeonhole. He received it when he was in a hurry, he put it up there, and the good man has not opened it to this day. Then again, he has so much to read, and so much of his mail goes into the waste-basket, that he does not take the time to sit down and read that book through. The point is to give the man instruction in the one particular thing that he needs to know at the moment and that comes up when he shows that in an examination he has not appreciated some particular point that aids the Medical Director in determining the insurability of that risk.

I see that quite a little attention has been paid by some companies to instruction in urinalysis, in the use of the sphygmomanometer, and in diseases of the heart, of course all most excellent, but it seems to me that we ought to go beyond that. We should not be called upon to make up for the shortcomings of his medical college though we find that we are obliged to. The medical colleges of the United States ought to educate not only physicians but Medical Examiners, because a very considerable part of the income of physicians is derived from medical examinations. It is a part of their medical work and a very essential and important part, and therefore I feel that, as has been intimated before, it will not be out of place for this Association through its Executive Committee to prepare and present a memorial to the medical colleges to secure a larger consideration of instruction in the medical side of insurance. In that utopian day when we have a standard examination blank accepted and used by all companies, the work of the Medical Examiner will be simplified and his education made easier.

The last point taken by Dr. Ward was the protection of the Medical Examiner. The first thing to protect the Medical Examiner in my mind is to so select your examiner direct from the Home Office that he will feel that the Home Office staff is his starting point. Now, how is it in the field? The agent writes in that he would like to have Dr. So and So appointed examiner. You look up the doctor's record, and soon you appoint him examiner. Before long in comes an applica-

tion from the doctor. Now the agent has selected that examiner, has given him a number of examinations, has persuaded him to insure, and that examiner is related to the Company through the local agent, not through the Medical Department. We try to do otherwise. We try to avoid having the agent get in before the Medical Department does. We try to make the start, and then hold that Medical Examiner to us by letters and by occasional visits. Of course we realize that in many of the smaller towns the visits are quite impossible, so correspondence must take the place of the personal visit.

Now suppose an agent writes in that he cannot get along with a certain doctor. You begin to look into the matter and you cannot get any information. You assume that your agent is all right, so you conclude to make a change. Six months afterwards you get a letter from this Medical Examiner in the field, the ex-Medical Examiner. He tells you that he has declined two or three risks and now learns that the agent on the streets of the city has been saying: "Well, I got the start of that examiner, he's not going to decline any more risks for me." Now where are you? In the hands of the agent, and not of a fair agent, but you are in the hands of the agent and the agent is trying to get all the business he possibly can out of that place, and your Medical Examiner who would protect you has been put aside by a lack of care in getting down to the bottom of things and finding out that after all he was in the right and the agent in the wrong. We cannot give too great personal attention to our examiners as a great corps in the field. If a company is so large that one medical man at the Home Office is insufficient, it is very easy to have the United States divided into sections and groups and have several. But the one way, in my opinion, is to have one officer at the Home Office who has the care and oversight of all the Medical Examiners in the field and who keeps in touch with them by personal visits and by correspondence.

DISCUSSION

Dr. Ward—Mr. President and Gentlemen. It would be a very great pleasure to comment upon these two instructive papers, but I would prefer to do this: I know that there are several who have some thoughts on the subject, and I suggest that we have three or four one-minute-each discussions to take the place of my closing remarks.

Dr. Wells—Dr. Willitts of the Provident Life was to have been here to talk on this subject this morning, but he is unavoidably detained. Dr. Tiemann, have you any remarks to make?

Dr. Tiemann—I only wish to say that I think the suggestion that the Association compile and send out with its endorsement a book of instructions is a very excellent one.

Dr. Wells—We would like to have a few of these one-minute talks. Dr. Rowley has a system, I believe, for the checking up of his examiners.

Dr. Rowley—We have a system for keeping a record of the work by our individual examiners. Dr. Ward paid us the honor of a visit to our office some time ago, and while there was impressed with the way we kept record of the work of each examiner, and acceding to his request, I would bring it before you, hoping I may get some benefit from the discussion and comments that may be made. As each report is looked over in the Medical Department the work of the examiner in connection with that report is noted and recorded on the data sheet by the member of the Medical Board reviewing the case. We have the following classification:

X—Especially commendatory work.

A—Satisfactory.

B—Carelessness, omissions, and other clerical errors.

C—Incompleteness, failure to make further examination or investigation when the advisability of such should have been clearly indicated.

D—Ability questioned, failure to discover impairments,

and impressions given from comment or lack of comment regarding any particular features.

E—Integrity questioned, failure to give complete information regarding family history, personal history, habits, reputation, or environment, when there is reason to suppose that adverse information relating to any of these are known to the examiner.

F—Service not satisfactory—not prompt.

I am sorry that we have not more time to go into these matters further, but I just bring this system before you, and I hope that I may have a chance to talk it over with others who may be especially interested.

Dr. Watson—I have been very much interested in both of these papers and in the discussions thereof but there is one thing that is very essential and that is a personal examination by a medical man of the work of the examiner. In 1895, the Prudential commenced such an investigation of their examiners' work and I did a good deal of that work for several years and I had some very interesting experiences. It was my custom to go to the offices of the Superintendents and detached assistants, talk over with them their different examiners, and have them go along with me to personally see some of the cases (which I have either taken along from the Home Office or obtained from their local registers) recently reported upon by their examiners.

Just two instances of the many I have had in my experience. In quite a large city in Massachusetts we had an examiner who had a splendid record and was one of the first-class physicians in that city. I took along a dozen cases which he had recently examined. I saw them personally. I explained to the applicants that the Company did a very careful and conservative business and that we kept track of all our employees, and I asked each of them who examined him. "Why, Dr.——." "What did he do to you?" "Well, he asked me the questions on the blank, a lot of questions, examined my chest, and had me sign my name." "Did he do anything else?" "No." "Sure?" "Why, yes, I remember very

well. He came to my store and examined me." "Did he ask you about your kidneys and whether you had ever been sick?" "He asked a lot of questions on the blank." "Did he take a specimen of urine?" "No." "Sure?" "Very sure." "Did he have a bottle with him, perhaps, and ask you to send some urine to his office?" "No, sir." "Sure?" "Very sure."

Each one of these cases gave the same answers. Then I went to the doctor's office, introduced myself, telling him I was around getting acquainted with our examiners and incidentally seeing how they did their work. I asked him if he remembered examining such and such a case. He said, "Yes." "You examined him in his store. Mr. — seems to be under the impression that you did not take a specimen of his urine." "But he is mistaken. I never send in a medical report without making a urinalysis." I went over each one of the cases with him in that manner and the result was that I selected another examiner at that place and personally instructed him.

Another case along the same lines. An examiner whom we did not know anything about in Ohio had succeeded as an alternate to the regular examiner. His credentials were O. K. in every respect. I had a dozen or fifteen of his recent reports. I saw each of the applicants. He had examined every one carefully, had asked all the questions on the medical blank, took their measurements, and had also obtained a specimen of urine. I was congratulating myself that here we had a fine examiner and I went to the doctor's office (it was between five and six o'clock in the evening), introduced myself, and asked some questions about the Book of Instructions, with which he was thoroughly conversant (and by the way, out of the five thousand examiners I have seen during these years nearly every one of them had his Book of Instructions and had read it). Incidentally, I saw a bottle on his desk wrapped up in paper and I said: "You have just examined a case." He said, "Yes." I said, "You have not examined the urine yet." He said, "No." I said, "Supposing you examine it

now." Well, he looked out of the window and said, "It is getting late, doctor, and I have not had my dinner yet. I am very tired." I told him I knew that; I hadn't had my own dinner and would not until I got back to Dayton. He finally got out his urinary set. They were all old and dirty except the lamp, which was new and had never been used. While trying to read the specific gravity he said: "I really can't see, doctor; what is that specific gravity? Is it 1044?" He said, "Oh yes, that's all right, 1044." He then proceeded to test the urine for albumin and sugar. I asked him the reason for same, particularly for sugar. He said that if the urine turned black with Fehling's Solution it indicated sugar. I told him it was evident he did not understand how to examine urine and he said that it was his custom to look at the specimen of urine and if it was clear he was satisfied it was all right, but if it was cloudy he would send the specimen to a friend of his who was a chemist, and he would report to him the result of his analysis, but that these cases rarely occurred. Needless to say, I selected another examiner in that city, carefully instructed him, and he has continued to do satisfactory work for the Company.

Now, just one other point. When I found examiners doing satisfactory work (in large cities I had them together with the superintendents) I explained to them in detail how we wished the work done, taking a medical blank and going over each question, instructing them to be sure of the identity of the person about to be examined, to take the pulse rate before commencing the examination, to always see the naked chest, to write the answers to the different questions in the presence of the applicant, and to be sure that the urine examined was voided by the applicant, and I always had an agent or superintendent with me while giving these instructions. Sometimes an agent would say: "You don't want me to go with you to see the examiner." I always replied: "I want you because I haven't anything to say to this examiner that I don't want you to hear."

Here is the crux of the whole business. We cannot tell



whether an examiner will do good work by sitting down and talking to him in his office or by writing him letters from the Home Office, but we can do so by personally seeing the cases he has reported upon.

Dr. Frank Wells—I have only one word to say on the subject, and that is, that we must be very careful in making our rules to the examiner, that we are not too theoretical. We all have a rule, and a very proper one, that a woman should remove her corsets to have the examination made. Now we all know that in the present day a woman is fearfully and wonderfully made, and if she removes her corsets she removes something else besides her corsets, and in nine cases out of ten she would refuse to have the examination made. If she is examined at the Home Office and disrobes, I confess that I am too modest a man to help her dress herself. Then we must be careful that we do not suggest our own rules and our own methods to examiners who have been properly selected, indicating to them that they must follow our methods when their own methods are just as good as ours.

Dr. Wells—I wish we had time to go further with this discussion. It opens up a very interesting subject. The next thing on the program is a discussion of the blood-pressure report which was submitted yesterday morning by the chairman of that committee. That discussion is now open.

#### REPORT ON BLOOD PRESSURE

By LEWIS F. MACKENZIE, M. D.

*Assistant Medical Director, Prudential Insurance Company, Newark, N. J.*

Since the last meeting of the Medical Directors' Association we have received a large number of additional blood-pressure readings and have thought that if an analysis of these was presented as a supplement to our report of last year it might prove interesting. Tables corresponding to and bearing the same numbers as in the original report are therefore appended, should any of the members care to compare our records for the years 1915-16 and 1912-16 with those reported last year. Tables showing the changes in diastolic pressure as influenced



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by pulse rate, height, and weight, have been added. Table III has been omitted this year, the figures being the same throughout as those of last year.

The number of cases giving both systolic and diastolic records for the years 1915-16 is 13,297, while the totals for the five years are 31,294 systolic, and 17,212 diastolic.

The systolic records for the past two years (Table I) serve to confirm the statement made last year that the correctness of the figures for systolic pressure at the various ages seems very certain.

The systolic range (Table II) at ages 40 and over is somewhat greater than that under 40, the high and low limits being each 2 mm. less for those under 40 than for those 40 and over. The normal limits of systolic pressure for all ages are the same as those given in Table III last year.

Table IV, with 20,223 records from normal weights, shows that for each increase of five beats in the pulse rate there is an increase of nearly 1 mm. Hg. in the systolic pressure.

The systolic records for the years 1915-16 (Table V) again show that weight has a distinct effect on this pressure, increasing it as the weight increases. The difference between the lightest and heaviest groups amounts to 9 mm.

Height (Table VI) again appears to have no appreciable effect.

Diastolic pressure (Tables VII, VIII, and XII) seems to increase with age, as does the systolic, but not quite to the same extent.

The figures for each age group are slightly lower than those of last year. These figures probably represent the averages between the readings of the fourth and fifth phases, as we have not always been able to determine at which point the reading was taken.

The diastolic range (Table IX) is somewhat less than that of last year. It is felt, however, that the figures for ages 40 to 66 are still far too high, and though for all ages the total range is 34 mm., or 17 mm. above and 17 mm. below the normal average, these will be further reduced with more accurate and uniform readings.<sup>1</sup> The high and low limits as given by the

records for 1915-16 (Tables X and XI) are within those given last year, but still outside the estimates of 1914 (Table XI). That there will be a further narrowing of these limits as the accuracy of the examiners increases is indicated not only by comparison of the tables but also by the large number of diastolic records now appearing in the literature on the subject.

Pulse pressure (Tables VII, VIII, and XII) seems to have increased a trifle when compared with Table XII of last year. It is also a shade larger (1 mm. Hg.) at the older than at the younger ages.

Pulse rate (Table XIII) has little or no influence on the height of the diastolic pressure.

Weight (Table XIV) indicates an increase in diastolic pressure very similar to that of the systolic, while height (Table XV) seems to have no influence on this pressure.

Recent researches in connection with the circulatory system have so modified our views with regard to cardiac disorders that to-day the prognosis of these impairments is based more on the efficiency of the heart muscle than on the presence of murmurs, etc. It is believed that the time is not far distant when our examiners will be so proficient in taking blood pressure readings that cardiac efficiency can be very accurately determined by them through changes in the diastolic and pulse pressures taken in various postural positions and before and after exercise. Changes in the diastolic and pulse pressures, both actual and relative, under these conditions furnish very satisfactory evidence as to the state of the heart muscle.

There is to-day, it is believed, no need whatever for arguments to prove the value of the diastolic or to show that it is the fundamental pressure upon which the significance of the other blood-pressure readings is based. The significance must still be considered, to a large extent, in its infancy. So many new facts are appearing in the literature on the subject that modifications in our methods and interpretation are as yet constantly necessary and we are of the opinion that, for some time, it will be advisable to give our examiners additional instructions as occasions for them seem to arise.

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We believe that to-day there are as good grounds for declining an applicant with a diastolic pressure over 100 or 110 mm., according to age, as there are for declining one having a systolic of 140 or 150 mm., and there seems to be as great justification for declining young applicants with systolic pressures over 140 as there is for declining older ones with systolics over 150 mm.

The assertions of last year have been, to a large extent, confirmed by the analysis of our recent records. Opinions expressed by those qualified to speak, and which are contained in the extensive literature on the subject, demonstrate, we think, that the time has now come when it can be said of the diastolic, as well as of the systolic, that the normal average for the various ages and the normal limits have been so definitely established as to warrant our using them with much more certainty than could have been done even one year ago.

TABLE I.  
AVERAGE SYSTOLIC PRESSURE.

Cases	1915-16 13,297	1912-16 31,934
<i>Ages</i>	<i>Mm. Hg.</i>	<i>Mm. Hg.</i>
15-19	120	120
20-24	122	122
25-29	123	123
30-34	124	124
35-39	126	126
15-39	124	124
40-44	127	127
45-49	129	129
50-54	132	132
55-59	134	135
60-64	136	137
65-66	*142	*140
40-66	129	129
15-66	126	126
	*22 cases	*40 cases

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TABLE II.

NORMAL SYSTOLIC RANGE.

Cases	1912-13 9,370	1914 9,268	1915-16 13,297	1912-16 31,934
	Mm. Hg.	Mm. Hg.	Mm. Hg.	Mm. Hg.
15-39	28	28	26	26
40-66	30	30	30	30
15-66	30	30	30	30

TABLE IV.

SYSTOLIC PRESSURE BY PULSE RATE IN NORMAL WEIGHTS.

Pulse Rate	1914-15-16 20,223
	Mm. Hg.
50-54	*123
55-59	†120
60-64	123
65-69	124
70-74	125
75-79	125
80-84	126
85-90	127
50-90	125
	*14 cases
	†18 "

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TABLE V.

## SYSTOLIC PRESSURE BY WEIGHT

Cases	1915-16 13,297	1912-16 31,934
	Mm. Hg.	Mm. Hg.
30% & under	*125	*127
20-29% under	123	124
Normal	125	125
20-29% over	129	129
30-39% over	130	130
40% & over	†132	†129
Total	126	126
	* 9 cases †52 "	*17 cases †93 "

TABLE VI.

## SYSTOLIC PRESSURE BY HEIGHT.

Cases	1915-16 13,297	1912-16 31,934
	Mm. Hg.	Mm. Hg.
5 ft. 2 in. and under	124	125
5 ft. 3 in. to 5 ft. 6 in.	125	125
5 ft. 7 in. to 5 ft. 10 in.	126	126
5 ft. 11 in. and over	126	126
Total	126	126

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TABLES VII, VIII, XII.

Cases	1915-16 13,297		1912-16 17,212	
	Diastolic Mm. Hg.	Pulse Pressure Mm. Hg.	Diastolic Mm. Hg.	Pulse Pressure Mm. Hg.
<i>Ages</i>				
15-19	82	38	83	38
20-24	84	38	85	37
25-29	85	38	86	37
30-34	86	38	87	37
35-39	88	38	89	37
15-39	86	38	87	37
40-44	89	38	90	38
45-49	90	39	91	38
50-54	91	41	92	40
55-59	93	41	95	40
60-64	*94	42	*96	40
65-66	†94	48	†95	49
40-66	90	39	91	38
15-66	87	39	88	38
	*81 cases †19 "		*93 cases †22 "	

TABLE IX.

DIASTOLIC RANGE.

Cases	1912-13 1,216	1914 2,699	1915-16 13,297	1912-16 17,212
	Mm. Hg.	Mm. Hg.	Mm. Hg.	Mm. Hg.
<i>Ages</i>				
15-39	42	38	32	34
40-66	50	40	40	42
15-66	44	44	34	34

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TABLE X, XI.

NORMAL DIASTOLIC LIMITS.

Cases		1915-16 13,297	
<i>Ages</i>	<i>Minimum</i> —17 mm.	<i>Average</i> Mm. Hg.	<i>Maximum</i> +17 mm.
15-19	65	82	99
20-24	67	84	101
25-29	68	85	102
30-34	69	86	103
35-39	71	88	105
40-44	72	89	106
45-49	73	90	107
50-54	74	91	108
55-59	76	93	110
60-64	77	94	111
65-66	77	94	111

TABLE XIII.

DIASTOLIC BY PULSE RATE. NORMAL WEIGHTS.

Cases	1914-16 14,314
<i>Rate</i>	<i>Mm. Hg.</i>
50-54	*81
55-59	†81
60-64	86
65-69	87
70-74	88
75-79	88
80-84	87
85-90	87
50-90	87
	*11 cases
	†24 "



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TABLE XIV.

DIASTOLIC PRESSURE BY WEIGHT.

Cases	1915-16 13,297	1912-16 17,212
	Mm. Hg.	Mm. Hg.
30% & under	*87	*90
20-29% under	85	85
Normal	87	88
20-29% over	90	91
30-39% over	91	92
40% & over	†92	†90
Total	87	88
	* 9 cases †52 "	*11 cases †62 "

TABLE XV.

DIASTOLIC PRESSURE BY HEIGHT.

Cases	1915-16 13,297	1912-16 17,212
	Mm. Hg.	Mm. Hg.
5 ft. 2 in. and under	85	86
5 ft. 3 in. to 5 ft. 6 in.	87	88
5 ft. 7 in. to 5 ft. 10 in.	87	88
5 ft. 11 in. and over	88	89
Total	87	88

Dr. Wells—Has anyone anything further to contribute to this discussion of the subject of blood pressure? If not, the discussion is closed.

The tellers then announced the result of balloting for officers, as follows:

PRESIDENT.

DR. HOMER S. GAGE.

FIRST VICE-PRESIDENT.

DR. WALTER A. JAQUITH.

SECOND VICE-PRESIDENT.

DR. A. B. WRIGHT.

SECRETARY.

DR. F. S. WEISSE.

TREASURER.

DR. A. S. KNIGHT.

EXECUTIVE COUNCIL.

DR. E. W. DWIGHT.

DR. G. A. VAN WAGENEN.

DR. T. H. ROCKWELL.

Dr. Wells—The next subject is that of urine examinations, a subject that I am sure will attract the attention of us all. Dr. D. N. Blakely of the New England Mutual will present this paper.

URINALYSIS: A REVIEW OF TEN YEARS' EXPERIENCE OF THE NEW ENGLAND MUTUAL.

BY DAVID N. BLAKELY, M.D.

*Assistant Medical Director, New England Mutual Life Insurance Company.*

At the sixteenth annual meeting of this Association, held in October, 1905, Dr. Edwin W. Dwight, Medical Director of the New England Mutual Life Insurance Company, read a

paper entitled, "The Significance of Albumin and Casts, when Found in the Urine of Apparently Healthy Applicants for Life Insurance." This paper was published in full, together with several quotations from medical literature not read at the time, in the Association's Reports, Volume I, pages 393 to 446, and a summary of the discussion of the paper will be found on pages 466 and 467. (There is a typographical error on page 467. The word "shows" in line 7 is an error. The reading should be, "Even if the urine *has shown*, in the past, albumin and casts.")

At that time there was practically no uniformity among the different Companies as to when microscopical examinations were required, either on account of the amount of insurance involved or the age of the applicant, or, when required, who should make the examination. I hardly need to remind you that there is not complete uniformity at the present time. Neither was there uniformity in the way applicants were treated who showed on examination or had shown in the past albumin or casts or both. There was, however, practical agreement as to "the desirability of considering in some way applicants who have had, at some time, albumin in the urine." In a word, no one was fully satisfied with the methods which had been in use and some were ready to try out some course that promised better or at least more logical results. The paper outlined the method which the New England Mutual had adopted as a working hypothesis to be followed until something better should be found. The method had been decided upon after an exhaustive study of the medical literature of the preceding thirty years. It was based on the general principle that the presence of albumin or casts, or both, in the urine of supposedly healthy applicants, who showed no other evidence of disease, may be only a symptom of disturbance of function of the kidneys due to some temporary—but not necessarily pathological—change in the action of the circulatory or the nervous system. It was believed that for the requisite analyses no complicated or unusual technique was needed, but rather that the common, simple, chemical tests, applied by trained

men, accustomed to accurate laboratory work, with a microscopical examination by the same men, would give consistent and dependable results. (The sediment for microscopic examinations was to be obtained by a combination of gravity and centrifuge.) As a tentative standard, the urine to be submitted to the chemist for a complete examination was required to have a specific gravity of 1020 or over and the percentage of urea must be 1.7 or over. The accompanying chart shows

NEW ENGLAND MUTUAL LIFE INSURANCE COMPANY

OF BOSTON, MASSACHUSETTS.

MEDICAL DEPARTMENT.

*Boston*,.....191

EXAMINATION OF URINE.

*Passed by*.....  
*In presence of*.....  
*Date passed*.....

Color . . . =	Reaction . . . =
Consistence . =	Specific Gravity =
Urea (per cent.) =	Sulphates . . =
Uric Acid . . =	E. Phosphates =
Chlorides. . . =	Alk. Phosphates =

ABNORMAL CONSTITUENTS

Albumin . . . =	Acetone . . . =
Sugar . . . =	Diacetic Acid =
Bile Pigments =	
Sediment.	
(1) Crystalline.	
(2) Casts.	
(3) Other organized elements.	

*Remarks:*

that we also ask for the relative proportion of chlorides, sulphates, and phosphates. All we expect is an approximate estimate to show whether they are normal or diminished or increased. As the years have passed we have never seen any reason for lowering this standard, namely, 1020 specific

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gravity, 1.7% urea. It is the irreducible minimum and, as a practical matter, our chemists are instructed to make these tests first and, if a sample has a specific gravity less than 1020 or a percentage of urea less than 1.7, the examination is to stop at that point.

At present we have, scattered over the country, thirty-two men appointed to make these special urinalyses. This is about two thirds the number of our General Agencies. A few are centrally located and can serve several Agencies. All are men connected with hospital or medical school laboratories and most of them are giving their whole time to laboratory work. The samples to be examined are forwarded by mail or messenger to the chemist and usually he knows absolutely nothing of what we may call the clinical side of the case—that is, he does not know whether the applicant is twenty years old or sixty years old, whether he has ever been examined before or whether he has been refused insurance by a dozen Companies, whether the doubt in the case is because of a previous report of albumin or because the local examiner has found an irregular heart. To him it is a sample of urine for careful analysis and report. If he chooses to draw any conclusions about the conditions, past, present, or future, of the person whose urine he has examined, it is for his own satisfaction alone. He is not asked for any conclusions, neither does he forward any with his report.

In the beginning, this special urinalysis was employed as an aid in determining which applicants out of the considerable number of those with a history of albumin or casts could be accepted as safe insurance risks. It was also employed in place of the so-called double examination, when the larger amounts of insurance were involved—that is, the Chief Examiner for the district was to make the usual routine examination and the chemist the complete urinalysis. Soon after, the special analysis was extended to include cases of circulatory disturbance such as an irregular or intermittent heart on examination or a previous report of high arterial tension or a heart murmur, provided it was not found on examination and reexamination.

We have made use of the test also in cases of overweights and some other impairments.

This present paper is essentially a report of progress, an attempt to tabulate and study, briefly, the results of ten years' experience. The material for study differs somewhat from that reported by other Companies, in that we have insisted upon a more concentrated urine than has usually been required. Our figures are not large but we have tried, and I think with success, to make our groups homogeneous, believing that careful study of homogeneous groups, even though small, warrants certain conclusions. I have divided the cases for study into groups according to the impairment which was the occasion for having the urinalysis made. Every applicant accepted gave a normal urine according to the standard mentioned above—that is, no albumin or sugar on chemical examination, no casts or other pathological elements in the sediment, and with a specific gravity of at least 1020 and a percentage of urea at least 1.7.

I shall not attempt to discuss at all the significance of small amounts of albumin, nor different kinds of albumin, nor the relative importance of one or two casts on a slide as compared with eight or ten. Neither shall I offer any positive suggestions for the safe selection of applicants with a history of glycosuria—and I hope that ten years hence we may have an opportunity to make a further report of progress.

Table I is a list of all the groups studied. Table II shows the number of exposures in each group, together with the expected deaths, actual deaths, and percentage of actual to expected, all computed according to the American Experience Table. The mortality in all our business issued during the ten years under discussion was approximately 48%. The mortality in the doubtful classes under discussion was approximately 62%.

TABLE I.

## LIST OF GROUPS.

- 1—Glycosuria
- 2—Glycosuria, the only impairment
- 3—Glycosuria, ages 18-39 inc.
- 4—Glycosuria, ages 40-59 inc.
- 5—Glycosuria, weight more than 15% below normal
- 6—Glycosuria, weight 15% below to 25% above normal
- 7—Glycosuria, present within one year
- 8—Glycosuria, present more than one year before
- 9—Albumin
- 10—Albumin or casts, the only impairment
- 11—Albumin or casts, ages 18-39 inc.
- 12—Albumin or casts, ages 40-59 inc.
- 13—Albumin or casts, weight more than 15% below normal
- 14—Albumin or casts, weight 15% below to 25% above normal
- 15—Albumin or casts, present within one year
- 16—Albumin or casts, present 1-3 years before
- 17—Albumin or casts, present 4-5 years before
- 18—Albumin or casts, present more than five years before
- 19—High Arterial Tension
- 20—Heart enlarged or heart murmur
- 21—Irregular Heart
- 22—Intermittent Heart
- 23—"Functional Cardiac"
- 24—Total, groups 19-23 inc.
- 25—Overweight, the only impairment (25% or more above normal)
- 26—Overweight, ages 18-39 inc.
- 27—Overweight, ages 40-59 inc.
- 28—Overweight, abdomen larger than chest
- 29—Overweight, abdomen larger than chest, ages 18-39 inc.
- 30—Overweight, abdomen larger than chest, ages 40-59 inc.
- 31—Amount of Insurance
- 32—Amount of insurance, ages 18-39 inc.
- 33—Amount of insurance, ages 40-59 inc.
- 34—"Apparently Good"
- 35—Age, 60 or over
- 36—Total, groups 31-34-35
- 37—Albumin or casts, amount of insurance and age 60 and over eliminated.



TABLE II.

## SUMMARY OF EXPOSURES AND MORTALITY

	Exposures	Expected Deaths	Actual Deaths	Per Cent.
1—	971	10.6	3	28.3
2—	617	5.9	1	16.9
3—	442	3.8	..	....
4—	175	2.4	1	41.7
5—	58	...	..	....
6—	558	5.8	1	17.2
7—	410	4.4	1	22.7
8—	207	.8	..	....
9—	4,905	51.6	26	50.4
10—	3,503	35.5	17	47.9
11—	2,645	22.6	10	44.2
12—	811	11.0	5	45.5
13—	508	4.6	2	43.5
14—	2,998	31.5	15	47.6
15—	2,320	24.2	12	49.6
16—	543	5.0	3	60.0
17—	221	2.1	2	95.2
18—	419	4.2	..	....
19—	111	1.3	..	....
20—	497	4.7	1	21.3
21—	147	1.0	..	....
22—	109	.2	1	500.0
23—	416	4.2	4	95.2
24—	1,280	11.4	6	52.6
25—	683	7.7	5	64.9
26—	349	2.7	..	....
27—	321	4.4	5	113.6
28—	781	10.3	9	87.4
29—	310	2.8	1	35.7
30—	465	7.4	7	94.6
31—	1,486	16.8	16	95.2
32—	761	7.0	6	85.7
33—	724	9.8	10	102.0
34—	351	3.4	1	29.4
35—	125	4.8	6	125.0
36—	1,962	25.0	23	92.0
37—	3,121	30.1	13	43.2

I need not read in detail all the figures in the tables. Group 1 represents all applicants with a history of glycosuria, group 2 those with a history of glycosuria but no other impairment. The difference between the two groups, 354 exposures, is made

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up almost entirely of those with a history of albumin and casts in addition to sugar.

Table III represents group 2, glycosuria alone, subdivided according to age at entry, weight, and time when the sugar was found.

TABLE III.  
GLYCOSURIA ONLY, SUBDIVIDED ACCORDING TO AGE, WEIGHT, AND TIME.

	Exposures	Expected Deaths	Actual Deaths	Per Cent.
3—Ages 18-39 inc.....	442	3.8	..	...
4—" 40-59 inc.....	175	2.4	1	41.7
5—Weight more than 15% below normal.....	58	...	..	...
6—Weight 15% below normal to 25% above normal.....	558	5.8	1	17.2
7—Sugar found within one year...	410	4.4	1	22.7
8—" " more than one year before.....	207	.8	..	...
Total of above (Group 2 of Table II).....	617	5.9	1	16.9

I think I am well within the bounds of truth when I say that all the Companies represented in this Association have been extremely cautious in the acceptance of risks who have had a history of glycosuria. The New England Mutual is no exception in this matter. Perhaps we have been too conservative. Certainly we have not had an excessive mortality in this class. In general, we have accepted only those whom we believed to be exceptionally good in other ways, in whom sugar has been found accidentally, so to speak, on examination for life insurance (and who, therefore, had never had dietetic or other treatment), and who were able to give normal urines on repeated examinations. In the great majority of cases, sugar was found but once. In a few it was found twice. If we look at the figures in Table III, it will appear that nearly three fourths of the 617 exposures when glycosuria was the only impairment were in men under forty and there were no deaths. The one claim in the 40-59 age group was a man who died at 58 of myocarditis. No applicant was accepted who showed

both glycosuria and excessive weight. Two thirds of those accepted had shown sugar either on examination or within the preceding year.

Group 9 of Table II represents all who had albumin and group 10 those in whom albumin or casts or both albumin and casts was the only impairment. I have assumed that albumin as found by the average examiner is renal albumin and that if casts are present, even when no albumin is demonstrated, there is evidence of disturbance of the kidneys. Many times albumin is found when no microscopic examination is made. For practical purposes, therefore, I believe these 3503 exposures represent a homogeneous group. One exception will be mentioned later. It is interesting to note that the mortality in this group, which represents a class which, for many years, has been considered doubtful by all Companies and which has been the occasion of much anxiety to many Medical Directors and Executive Officers, is identical with that of all our business issued during the same period of time.

Table IV represents group 10 of Table II, albumin and casts the only impairment, subdivided according to age and weight of applicant and the time when albumin was found.

TABLE IV.

ALBUMIN OR CASTS ONLY, SUBDIVIDED ACCORDING TO AGE, WEIGHT, AND TIME.

	Exposures	Expected Deaths	Actual Deaths	Per Cent.
11—Ages 18-39 inc.....	2,645	22.6	10	44.2
12— " 40-59 inc.....	811	11.0	5	45.5
13—Weight more than 15% below normal.....	508	4.6	2	43.5
14—Weight 15% below to 25% above normal.....	2,998	31.5	15	47.6
15—Present within one year.....	2,320	24.2	12	49.6
16— " 1-3 years before.....	543	5.0	3	60.0
17— " 4-5 " ".....	221	2.1	2	95.2
18— " more than five years before.....	419	4.2	..	....
Total of above (Group 10 of Table II).....	3,503	35.5	17	47.9

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These figures call for no extended comment. There is no material difference in the mortality of the younger and older applicants nor in the lightweights compared with those of normal weight. I am reluctant to draw any conclusions as to the significance of the time when albumin was found. I do not believe that albumin present five or more years before examination should be disregarded, nor do I think that the figures in groups 15 and 18 should be so interpreted. The number of exposures in the different groups varies considerably and it is probable that by following these risks over a longer time we shall obtain more accurate results.

While the causes of death in any class are of less importance than the fact of death, it is perhaps worth while to enumerate them and they are, for these groups, as follows:

### THE TWELVE DEATHS OF GROUP 15—ALBUMIN PRESENT WITHIN ONE YEAR—WERE

<i>Cause of Death.</i>	<i>Duration of Policy.</i>	<i>Age at Death.</i>
Accident.....	8.....	41
".....	3.....	26
".....	2.....	41
Pulmonary Tuberculosis.....	4.....	29
".....	7.....	50
Duodenal Ulcer.....	8.....	46
Chronic Appendicitis.....	2.....	51
Locomotor Ataxia.....	5.....	46
"Acute Indigestion".....	3.....	52
"Congestion of Brain".....	3.....	67
Cerebral Hemorrhage.....	5.....	57
Apoplexy.....	1.....	66

### THE THREE DEATHS OF GROUP 16—ALBUMIN PRESENT 1-3 YEARS BEFORE—WERE

<i>Cause of Death.</i>	<i>Duration of Policy.</i>	<i>Age at Death.</i>
Diphtheria.....	2.....	23
Pulmonary Tuberculosis.....	6.....	30
Empyema (fol. pneumonia).....	4.....	37

THE TWO DEATHS OF GROUP 17—ALBUMIN PRESENT 4-5 YEARS BEFORE  
—WERE

<i>Cause of Death.</i>	<i>Duration of Policy.</i>	<i>Age at Death.</i>
Accident.....	3.....	30
Septic Peritonitis.....	1.....	26

Table V represents the six groups, 19 to 24 inclusive, of Table II and shows our experience with cases of circulatory disorder. The total number of exposures, shown in group 24, is 1280 and the mortality 52.6% but the figures in the different

TABLE V.

## CIRCULATORY IMPAIRMENTS.

	Exposures	Expected Deaths	Actual Deaths	Per Cent.
19—High Arterial Tension.....	111	1.3	..	....
20—Heart Enlarged or Heart Mur- mur.....	497	4.7	1	21.3
21—Irregular Heart.....	147	1.0	..	....
22—Intermittent Heart.....	109	.2	1	500.0
23—"Functional Cardiac".....	416	4.2	4	95.2
24—Total of above five groups.....	1,280	11.4	6	52.6

groups vary markedly. Group 19 is made up of those with a previous record of high arterial tension but no other impairment. They were accepted only after careful examination of heart and arteries, and in the few instances in which a blood-pressure reading was obtained, the systolic pressure did not exceed 150. Group 20 includes those who had previously shown an enlarged heart or a heart murmur but, on our re-examination, showed neither. Groups 21 and 22 include a relatively small number of applicants who showed on our examination an irregular or intermittent heart but no other cardiac abnormality. Group 23 is made up of a somewhat

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larger number of those with a previous record of "functional cardiac." In the two groups, high arterial tension and irregular heart, there were no deaths. In the heart enlarged or heart murmur group there was one death from pneumonia and empyema or 21.3% of the expected. In the intermittent heart group or 109 exposures there was one death from pneumonia, giving a mortality of 500%. In the "functional cardiac" group of 416 exposures, the mortality was 95.2%.

The causes of death in these groups were as follows:

### CIRCULATORY IMPAIRMENTS.

Group	Cause of Death	Age at Death
20—Heart Enlarged or Heart Murmur...	Pneumonia and Empyema	48
22—Intermittent Heart.....	Pneumonia	56
23—Functional Cardiac.....	Chronic Interstitial Nephritis	60
	Gangrene of Lung	31
	Appendicitis	34
	Apoplexy	59

Table VI gives our experience with heavyweights—that is, those more than 25% above normal, and Table VII with heavyweights combined with large abdominal girth. The causes of death are given below each table.

TABLE VI.

### OVERWEIGHTS (25% OR MORE ABOVE NORMAL).

	Exposures	Expected Deaths	Actual Deaths	Per Cent.
25—Total overweight.....	683	7.7	5	64.9
26—Ages 18-39 inc.....	349	2.7	..	....
27—" 40-59 ".....	321	4.4	5	113.6

## GROUP 25—OVERWEIGHTS (25% OR MORE ABOVE NORMAL).

<i>Cause of Death.</i>	<i>Age at Death.</i>
Cerebral Hemorrhage.....	58
Pulmonary Tuberculosis.....	59
Sarcoma of Prostate.....	50
Accident.....	41
Cancer of Intestines.....	42

TABLE VII.

## OVERWEIGHTS (25% OR MORE ABOVE NORMAL) WITH ABDOMEN LARGER THAN CHEST.

	Exposures	Expected Deaths	Actual Deaths	Per Cent.
28—Total overweights with large abdomen.....	781	10.3	9	87.4
29—Ages 18-39 inc.....	310	2.8	1	35.7
30— " 40-59 " .....	465	7.4	7	94.6

## GROUP 28—OVERWEIGHTS WITH ABDOMEN LARGER THAN CHEST.

<i>Cause of Death.</i>	<i>Age at Death.</i>
Apoplexy.....	54
Edema of Glottis.....	46
Brain Tumor.....	46
Paroxysmal Tachycardia.....	68
Endocarditis.....	54
Typhoid Fever.....	33
Cerebral Hemorrhage.....	59
Acute Indigestion and Heart Failure.....	49
Chronic Nephritis.....	58

Table VIII represents groups 31 to 36 inclusive of Table II and includes those with no *medical* impairments. The urinalysis was made either because of the amount of insurance applied for or because the applicant was more than 60 years old or through a misunderstanding, when it was not required by our rules. Group 34, "apparently good," includes those analyses made when not required. The specimen was sent to the chemist usually by mistake and occasionally when the agent hoped to persuade the applicant to apply for a larger



TABLE VIII.

## APPARENTLY GOOD.

	Exposures	Expected Deaths	Actual Deaths	Per Cent.
31—Amount of insurance.....	1,486	16.8	16	95.2
32— " ages 18-39 inc.....	761	7.0	6	85.7
33— " 40-59 ".....	724	9.8	10	102.0
34—"Apparently Good".....	351	3.4	1	29.4
35—Age—60 or over.....	125	4.8	6	125.0
36—Total—groups 31-34-35.....	1,962	25.0	23	92.0

amount. Group 36 is the total of these groups and shows 1962 exposures with a mortality of 92%. The difference in the mortality ratio in the three groups, however, is worth noting, the "apparently good" group showing only 29.4%, the "amount" group 95.2%, and the "age" group 125%. The "amount" class includes nearly the same number of applicants below and above forty years of age, as shown in groups 32 and 33. The mortality in the group of older men is somewhat higher, 102%, as compared with 85.7% in the group of younger men. The causes of death in these three groups are as follows:

## GROUP 31—"AMOUNT OF INSURANCE."

<i>Cause of Death.</i>	<i>Age at Death.</i>
Pneumonia.....	26
".....	54
Pneumonia and Empyema.....	37
Pneumonia.....	39
Drowned (accident).....	43
Typhoid Fever.....	37
".....	39
Cancer of Prostate.....	68
".....	52
Insanity.....	56
Angina Pectoris.....	59
Paralysis of Heart.....	54
".....	48
Myocarditis.....	55
Angina Pectoris.....	59
Arteriosclerosis.....	41

## GROUP 34—"APPARENTLY GOOD."

<i>Cause of Death.</i>	<i>Age at Death.</i>
Suicide by Gas.....	52

## GROUP 35—"AGE, 60 OR OVER."

<i>Cause of Death.</i>	<i>Age at Death.</i>
Paralysis.....	74
Congestion of Brain.....	68
Endocarditis, Influenza.....	66
Typhoid, Malaria, and Nephritis.....	64
Pneumonia.....	63
".....	61

It would appear that very great care is needed in considering men past 60. What about the men who apply for the larger amounts of insurance? Is the mere fact that a man is prosperous and able to carry large policies, to be considered an impairment? This is too big a question to be discussed fully within the limits of this paper but it is an important point and one which I trust will be considered in the general discussion.

In speaking of group 10 as a homogeneous group, it was said that one exception would be mentioned later. When we decided upon the groups for study, we thought we had in group 10 one in which albumin or casts was the only impairment. Later we found that the "amount" group and the "age, 60 or over" group each gave such a high mortality as to raise the question whether these conditions should not be considered in themselves impairments, so we went over the cards again, with the results shown in group 37. Instead of 3503 exposures with a mortality of 47.9%, we have 3121 exposures, with a mortality of 43.2%.

One should be cautious in drawing conclusions from any group of statistics, but we feel that these expert urinalyses have been of very great assistance in making selections in doubtful cases, especially those with urinary or circulatory impairments. These doubtful classes include many applicants who deserve especially careful and fair consideration, and any additional test which contributes to this end is well worth while.

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Dr. Wells—Dr. Ogden of the Metropolitan will open the discussion of this very interesting paper.

### DISCUSSION BY DR. J. BERGEN OGDEN.

We are greatly indebted to Dr. Blakely for this valuable contribution to urinary literature. This paper is of particular interest to me because we are able to make some comparisons between the work of the New England Mutual Life Insurance Company and the Metropolitan Life Insurance Company. One year ago I gave you the experience of the Metropolitan for ten years in cases showing urinary impairments, and our mortality in these cases was then 45% on the American table and that of the New England Mutual is 62%. There is, therefore, not a great difference between the experiences of the two Companies in these urinary cases. When we look at the mortality experience of the New England Mutual in all of their business we find that the urinary cases are 14% above the percentage in the total business, whereas in the Metropolitan the urinary cases show a death rate of 5% below the average for all of the ordinary business. Considering the great care that the Medical Directors of the New England Mutual exercise in the selection of cases, it will be interesting to all of us if Dr. Blakely can tell us just why the figures in the urinary cases are so much higher than in the general business.

I know that Dr. Blakely and Dr. Dwight will pardon me for referring to the standard which they maintain in regard to the specific gravity and the percentage of urea in urine. It seems to me that a standard of a specific gravity of 1020 and 1.7% of urea is too high. Dr. Blakely says: "It is the irreducible minimum, and as a practical matter our chemists are instructed to make these tests first and if the sample has a specific gravity of less than 1020 or a percentage of urea less than 1.7, the examination is to stop at that point." This may be perfectly safe business for the New England Mutual, but it is hardly fair to the applicant, and I feel safe in saying that that Company loses a certain amount of good business by adhering

## Discussion by Dr. J. Bergen Ogden 435

strictly to this standard. An applicant for insurance may void the urine which is temporarily deficient in solids, perhaps due to the ingestion of a glass of beer or other liquid, when subsequent study would show that the average solids were not far from the normal.

Table III in Dr. Blakely's paper is full of surprises. The death rate is so low at all ages below 59, and even where the weight is as much as 25% above the normal. A sugar history within one year also seems to make no difference. Just why the New England Mutual experience differs from that of most other Companies in this class of cases is difficult to explain, except by the most careful selection. It would seem likely, however, that a longer experience in these cases would give considerably higher figures than are obtained in ten years' time.

Table IV emphasizes the fear that I expressed a year ago. Groups 15, 16, and 17 in Table IV give us a little idea of the danger of a history of albuminuria or the presence of casts within five years' time. While the experience of the Metropolitan in this particular group of cases was particularly good for ten years, and that of the New England Mutual not particularly bad, I made this statement one year ago: "Notwithstanding this favorable showing in the ten-year period, I must confess a feeling of some anxiety as to the results we shall obtain in from 15 to 20 years for the reason that, in this particular group of cases, the character of the urine varies greatly from week to week. There is, therefore, a likelihood of accepting risks who have an important kidney disease. This danger is increased because of our limited means of getting at the true condition through the urine or by physical examination."

It is interesting to see how few cases with urinary impairments die of kidney disease or important trouble in any other part of the urinary tract. This was apparent in my report at the last meeting. It seems to me, however, that the cause of death in these cases is not so important as the fact that they died. It is extremely difficult, and indeed impossible, for us

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to know just what part the kidneys may have taken in the cause of death, and we must also take into consideration the somewhat unreliable information that we obtain as to the exact cause of death in these claims.

We are indebted to Dr. Blakely for this careful study of these interesting cases, and I hope that other Companies will give us the results of their experience for the enlightenment of all.

Dr. Wells—I will call upon Dr. Pauli of the Union Central Life to continue the discussion.

Dr. Pauli—Dr. Blakely's paper adds another important contribution on the subject of urinalysis, which considers the result of ten years' experience from an actuarial standpoint and thereby gives us a definite and complete report. Following the remarkable paper of Dr. Ogden at the last meeting of this Association which set a new standard for investigation on the value of urine analysis, we are very much indebted to Dr. Blakely and the New England Mutual for the admirable report of their experiences.

The volume of material is not large, but as Dr. Dwight indicated in his paper read before this Association in 1913, small classes may show accurately the character and trend of mortality of such groups, and such statistics are very helpful to all of us in our selection of risks. We are learning to deal in a more scientific way with the principles of medical selection.

There is nothing to criticize in this paper and anything I have to say is based upon the difference in opinion and practice of the Company which I represent.

The essayist states that the material for study differs somewhat from that reported by other Companies, in that a more concentrated urine has been required; that their chemists are instructed that if a sample has a specific gravity less than 1020 or if the urea is less than 1.7%, the examination of the urine is to stop at that point, for the reason, as Dr. Dwight explained at the last meeting, that the New England Mutual considers the risks with specific gravity below their irreducible limit and

less than 1.7% urea as very much the most dangerous class with which they have to deal.

This requirement, in my opinion, is too rigid for practical purposes and I should like to ask Dr. Blakely what percentage of risks are declined solely because of urine analysis in order to maintain such a high standard.

The Union Central requires a specific gravity of 1012 and only on risks where the amount is \$50,000 or over is a specific gravity of 1016 required.

The percentage of declinations on account of urine analysis alone, from 1907 to October 1, 1916, is as follows:

30,956 examinations  
3,554 declined  
11.12%

We do not determine the amount of urea present for the following reasons: The amount of urine voided in twenty-four hours averages 1500 to 1800 c. c. The average amount of urea excreted in twenty-four hours for a man on a mixed diet is about 30 grams, varying between 24 and 40 grams; if the diet is a non-nitrogenous one, 15 to 20 grams a day; upon a very rich proteid diet even as much as 100 grams has been excreted.

The amount of urea will vary with the diet and a quantitative estimation of urea is a problem of metabolism which requires a proper knowledge of the nitrogen intake or proteid content of the diet and also the total amount of urine voided in twenty-four hours. Urea affects the specific gravity of urine more than any other constituent, provided, of course, that sugar is absent. The urea is mainly responsible for specific gravity.

Experience has shown that a

Sp. gr. of 1014 corresponds to about 1% urea,  
Sp. gr. of 1015 to 1020 corresponds to about 1½% urea,  
Sp. gr. of 1020 to 1024 corresponds to about 2¼% urea,  
Sp. gr. of 1028 corresponds to about 3% urea.



Therefore, the limitation of specific gravity will control, for all practical purposes, the urea content of urine.

I believe the estimation of urea is done for the purpose of detecting applicants who limit their protein diet in order to eliminate albumin from the urine, just as applicants who have glycosuria will restrict carbohydrates in their diet to obtain urine free from sugar. I question very much whether such restriction of protein diet will eliminate albumin from the urine. In other words, I do not believe that the urea test can be applied to nephritics in the same way as an acetone test is used to detect diabetics. The kidneys in certain forms of nephritis, excluding chronic interstitial nephritis, will excrete albumin whether the proteids in the diet are restricted or not.

It is undoubtedly true that the amount of urea is diminished in severe cases of nephritis, but such kidneys will always show some evidence of albumin or casts in the urine. Whether the amount of urea excreted is diminished before any albumin or casts can be detected in the urine is very dubious and a larger percentage of good risks are declined by such a procedure than the excretion of urea warrants.

Nor does the Union Central determine the relative proportion of chlorides, sulphates, and phosphates, as the salts in the urine are affected chiefly by the diet and a crude estimation of these salts does not indicate whether the kidneys are performing their functions properly. If a functional test is desired, the pheno-sulpho-phthalein test should be used. But this is not practical for insurance work except in special cases.

There is no question that chemical and microscopical examination of urine with a low specific gravity is not as satisfactory as the examination of urine with a specific gravity of 1020 or over. A urine of low specific gravity rarely shows casts or albumin on examination, and often when the second sample is received of high specific gravity, albumin or casts are found.

The only question is whether a high standard of specific gravity does not decline a large number of risks in order to detect a few bad ones. There is no doubt in my mind that a thousand cases with specific gravity of 1020 or over will show



a lower mortality ratio than a thousand cases accepted with a specific gravity of 1012 or over, especially if the risks are past the age of 40. Therefore, in interpreting the results given in the tables presented, it is very important to remember that practically only gilt-edge samples of urine have been accepted.

Except for the requirement of specific gravity of 1020 and urea of 1.7% (which I admit is a marked difference from the Union Central practice) our practice has been similar to the New England Mutual, in that we also accept risks who have a history of albumin and casts or sugar in the urine; also when heart murmur and irregular pulse had been found, provided our examination reveals no heart lesion.

The cases presented by the New England Mutual were very rigidly selected along conservative lines, in that they only approved applicants who gave a normal urine, according to the standard mentioned above—that is, no albumin or sugar on chemical examination, no casts or other pathological elements in the sediment, and with a specific gravity of at least 1020 and a percentage of urea at least 1.7.

We are more liberal in the acceptance of risks, as we approve samples of urine with a few hyaline casts (not over 12 hyaline casts in three samples) and slight traces of albumin. Our limit of red blood cells is an average of one or more blood corpuscles to each field with high power lens ( $\frac{1}{8}$  in.); and pus cells over 24 to a field of high power ( $\frac{1}{8}$  in.) objective, in two or more samples, declines the risk.

Regarding the first group of cases, with glycosuria, 617 exposures with a mortality ratio of only 16.9% of expected is a remarkable record and shows the effect of a very rigid selection, especially in view of the fact that 442 exposures were at the younger ages, when diabetes is more dangerous. It is well to emphasize the statement that no risks were accepted with a history of glycosuria, if the applicants were over 25% overweight. Glycosuria is largely a question of individual tolerance for carbohydrates. A normal individual who ingests an abundance of sugar at one time will show some sugar in the urine voided two or three hours later, and these cases with a

definite history of an overindulgence in sweets can be safely accepted, provided the urine on repeated examination is found to be normal. It is our practice where mere traces of sugar are found in the first sample (not over  $\frac{1}{2}\%$  sugar) to examine two additional samples, and if these are free from sugar and acetone, the risk is accepted. If a large amount of insurance is applied for, we require a sugar test meal, in order to determine whether the tolerance for carbohydrate food is below normal. This test is administered by the examiner and consists of eight lumps of table sugar (40 gms. of cane sugar) dissolved in one glass of water, taken after the noon meal. The examiner then obtains a sample between two and three hours after the sugar test meal, and if this sample is normal, the risk is approved for any amount. The cane sugar test is not as scientific as the 100 gms. of glucose but it is more practical and gives the desired result.

The second class of cases, with a history of albumin and casts, the 3503 exposures represent good business and the New England Mutual is to be congratulated upon their results. It is interesting to note that where the time limit is five years or more since the report of albumin or casts, there was not a single claim in 419 exposures. I believe, however, that it is very important to consider whether the condition has been a chronic one, whether albumin and casts have been repeatedly present for a period of several years. Such risks are borderline cases and require very rigid selection, whereas a single impairment, regardless of the time, is not so serious. In this group 10 the causes of death are singularly free from heart disease and also kidney disease, which is rather remarkable.

The third class of cases, with circulatory disturbances, shows the value of careful urinalysis in selecting risks with high arterial tension. It is very gratifying to see such a low mortality rate. It is our impression also that a careful analysis of the urine protects the Company to a certain extent from accepting risks with heart disease. Albumin and casts can be detected in the urine of risks who are on the verge of a broken compensation, when no heart lesion can be discovered by the

examiner. It may be due to myocarditis or arterio-sclerosis without the occurrence of any adventitious sounds in the heart.

The fourth class—overweights 25% or more above the standard—demonstrates the extra hazard of this impairment which has been repeatedly emphasized before this Association. Overweights will show a high mortality rate past the age of 45. It is worthy of note that the urine analysis apparently eliminated any deaths from cardio-renal disease, which is usually expected in this class of risks.

Another interesting feature which the essayist emphasizes in his paper is the high mortality rate in the group of large amount of insurance applied for, with 1486 exposures and a mortality ratio of 95.2%. It is the general experience, I believe, of most insurance companies, that the large risks have a higher mortality rate than the risks who apply for smaller amounts of insurance. They usually lead a more active life, under a greater nervous tension, apply more closely to their business affairs and often carry greater financial worries, and usually do not obtain the required rest at night and are more prone to develop cardio-renal disease. Then, too, the speculative feature is involved in risks who apply for large amounts. Speculating risks always apply for large amounts and usually take all the insurance that will be issued, in the hope that they will gain by the speculation. These risks usually die suddenly from apparently unknown causes or the result of some accident.

Regarding risks age 60 and over, all insurance companies take a chance on betting on the wrong horse. An examination of a risk past the age of 60 is no assurance that his health will be good six months after the examination. A careful urinalysis is of great advantage in the selection of these risks, but it does not indicate what the applicant's vitality is at the age of 60. It has been our experience that it is impossible to differentiate between the urine of a risk past the age of 60 from a sample obtained from an applicant 30 years of age. The examiner cannot determine the condition of the heart

muscle or coronary arteries, or the cerebral vessels in a risk past the age of 60.

We are particularly pleased to have this paper presented by Dr. Blakely, as we have followed similar methods in selecting risks with a previous history of impairments. These statistics are so very favorable that it strengthens our attitude to continue our former practice. I am sure we are all very much indebted to Dr. Blakely for his splendid paper.

Dr. Wells—The discussion of Dr. Blakely's paper is now open. I am sure there will probably be a number who will want to say something upon it.

Dr. Fisher—Mr. President and Gentlemen, I understand that the number 3500 referred to represents the years of exposure. I have before me the record of 1185 individuals accepted for insurance by the Northwestern, where a history of albuminuria had been previously reported, either by the Northwestern or some other Company in the interchange, covering a period of fifteen years, from 1893 to 1907, both inclusive. The mortalities computed by the Actuaries' table and carried up to January 1, 1908, gave a mortality of 42% as compared with the general mortality of the Company covering the same period of 54.77% by the same table, divided as follows:

<i>Albumin Present</i>	<i>Cases</i>	<i>Expected Deaths</i>	<i>Actual 174s</i>	<i>Mortality</i>
Within 1 year prior to issuance of policy	259	13	6	44%
Between 2-3 years " " " " "	297	13	4	29%
3 or more years " " " " "	629	32	15	46%

I have also a record of 387 cases, covering the same period, in which the Company had declined insurance on account of a history of albuminuria, reported by the Northwestern or some other Company in the interchange, with a mortality

of 194% of the Actuaries' table. Expected deaths, 42; actual deaths, 82. Of the 82 deaths, 29 died of nephritis. The average number of years survived by those who died of nephritis was 4.68 years.

I have also a record of 519 cases, covering the same period, 1893-1907, in which sugar had been found in the urine prior to the acceptance of the risk for insurance. Of these 519 cases (expected deaths 30) there were 12 actual deaths, or 39% of the table.

I also have a record of 127 cases which had been declined on account of sugar in the urine. There were 19 expected and 26 actual deaths, with a mortality of 133.93% by the Actuaries' table.

Of Class No. 7, Medico-Actuarial Investigation, furnished by the Northwestern to the Medical Actuarial Committee, there were 6308 exposures, or 1203 cards under observation. Albumin in urine without examination for casts. There were 39 deaths with 40.71 expected. Mortality 95.80 as compared with 111% for the forty-three companies by the M. A. Table.

As a rule covering all of the above cases, a specific gravity of 1010-1029 was considered normal.

Dr. Ogden—Mr. President and Gentlemen, I am very much interested in these figures of Dr. Fisher's. They are so close to those of the Metropolitan. I do not know why, except as Dr. Rogers and Dr. Willard would say, the country is safe with our present way of doing things. The comparative percentages and those of the total business in the same period are in about the same ratio we have in the Metropolitan, although their figures are for five years longer period.

Dr. King—Mr. President, I should like to ask Dr. Blakely one question. Does the New England Mutual Life keep any record of what happens to those cases that are declined because of the specific gravity and lack of urea, so as to know what happens to that group in the course of time?

Dr. Wells—Has anyone else anything to say? If there is no further discussion of this paper of Dr. Blakely's, I will ask the doctor to close the discussion at this time.

Dr. Blakely—I thank these gentlemen for the way in which they have discussed the paper. As I say, it is a report of progress; we hope to make another report later on.

To answer the last question first, as to whether or not we have kept a record as to the cases declined on account of low urea, we have not tabulated our results. I hope we may do that some time as it would certainly be an interesting thing to look up. I want to emphasize one point which I did not emphasize in the papers, and which I did not think of as necessary until it was suggested by one of your remarks, and that is that this standard of 1020 and 1.7 urea does not apply to every applicant for insurance by any means. It is only those who are doubtful, those where we require microscopical examination. We take the ordinary, everyday applicant with a specific gravity of 1010 and above, and if no microscopical examination is made, no urea test is made. It is only in the doubtful cases that we require this.

Dr. Ogden asked why our mortality should be 62% instead of 48% of the total business, their experience having been that their mortality figures were a little lower than the general. This includes all cases reported to date. If we took only our sugars, or those who showed albumin and casts, or those with circulatory impairments, our figures are:

Sugar.....	28.3%
Albumin and Casts only.....	43.2%
Circulatory Impairments.....	52.6%

We got our high mortalities in the over-weights, over-weights with large abdomens, and in the large amounts. And let me say that the mortality figures are by number and not by amount, so that the Executive Officers would have reason to look very carefully at the figures in the amount class, 95% by number, of course very much higher by amount.

It seemed to be suggested that perhaps we were a little severe on the applicants who did not give us a high urea or a high specific gravity on the first trial. We are very generous in giving them chances to try again and again, if need be. Of



course every man will pass a dilute urine at times, every man will pass a urine with relatively low urea under the ordinary conditions of life and of diet. If he persistently passes low urea in proportion to the specific gravity, we are afraid of the risk. That is the dangerous class we refer to, those who pass urine of 1020, 1022, 1025, 1028 specific gravity, but never can get the urea up to 1.7. It will be 1.2, 1.5, 1.6. Those are the men we are afraid of, because we believe that they are under mental strain, that this is the most important single factor, perhaps. We could give you illustrations over and over again, if there were time, of men where that has proved to be the determining factor, and when the mental strain was past, when they were living under better conditions, after a few months or a year or two, they gave absolutely normal urines.

Dr. Pauli asks if I could tell what percentage of our risks were declined on account of urinary impairments. I am sorry to say that I have not the figures.

We of course occasionally lose some good risks, but the figures are interesting when we compare the causes for sending for the urine, as I gave them last year. Of our doubtful cases, doubtful because of large amount, or of age, we were able to accept 89% of all applicants. Of those who were doubtful for miscellaneous reasons, not urinary, including circulatory, we were able to accept 67%; of those who had albumin and casts we were able to accept 53% of all applicants. So instead of declining a large number, I like to put it that we are able to accept a large number of an extremely doubtful group.

Just one word more. I want to express my great appreciation of the help that Dr. Dwight has given me in all the years I have been in the New England office, in studying this question, and in preparing the line to report on at this time. He has been deeply interested, as you know, from the beginning, and I might also add that our Executives are very much interested in these reports. We had one case which passed the Medical Director, was approved, passed the Vice-President with his approval, and the President said: "Let us have



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a urine on it," and the man was declined, and he proved to be a bad risk at that. So you see our Executive Officers appreciate the value of this work.

Dr. Wells—We have time before adjourning for luncheon for the presentation of the next paper on the subject of Diabetes, by Dr. Patton of the Prudential, who will give us an extract from his paper rather than the full paper at this time, and we will defer the discussion of it until after luncheon.

### THE IMPORTANCE OF GLYCOSURIA IN LIFE INSURANCE

By J. ALLEN PATTON, B.S., M.D.

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The medical department of every life insurance company recognizes the importance of definitely determining whether or no the positive reaction showing glucose in the urine of a life insurance applicant is indicative of a temporary glycosuria or of a true diabetes.

It is my desire to place before this Association some of the theories and facts concerning glycosuria and diabetes that have been reported, and it is my hope that the discussion will bring out methods that will enable us to better protect the interests of the life insurance companies without dealing unjustly with any applicant, and that we may be more able to differentiate the true diabetic from the temporary glycosuric.

Allen states that glycosuria, or the presence of glucose in the urine, is the chief symptom of diabetes, the disease, which is due to a defect in metabolism; that all clinical glycosurias should be considered as diabetes until demonstrated to be something else, and that slight glycosuria is nearly always diabetes and yields to mild anti-diabetic treatment, but, if neglected, it may become complicated and pass into the severe form. The coöperation of the patient and physician is necessary in treatment, and this is the most important requirement in reducing the death rate from diabetes.

Emerson states there are small amounts of carbohydrates normally in the urine and their total in twenty-four hours may measure 2 to 2.23 gm., with the glucose 0.38 to 0.62 gm. alone.

Glycosuria is spontaneous where it occurs with the person on an ordinary mixed diet, but if it continues for several weeks or longer, it is generally diabetic. Alimentary glycosuria usually follows a meal rich in sugar or starches and lasts but a few hours, the starch type being more likely diabetic. Normal persons excrete no glucose, or not more than 1 gm., after a meal containing 200 gm. of glucose, though glycosuria is most likely if the sugar is taken on an empty stomach. The physiological limits can be determined by Naunyn's test meal in clinical patients, but this opportunity is rarely given by insurance applicants. Assimilation tests, a few months after glycosuria has disappeared and again a few months later, are necessary to determine whether the individual is a true diabetic.

Barniger and Roper, by repeated assimilation tests in a series of patients five years after spontaneous glycosuria had been discovered, found 20 per cent. had become definitely diabetic, 15 per cent. probably, but not definitely, 10 per cent. very doubtful, and 55 per cent. were undoubtedly not diabetic; hence their results disagree with von Noorden's theory that claims all spontaneous cases as latent diabetics. Hunger diabetes in animal experimentation is believed to be similar to the glycosuria due to malnutrition in people suffering with chronic wasting diseases.

Hoppe Seyler reported ten tramps, who had been under poor hygienic and dietetic conditions, whose temporary glycosuria disappeared in 24 hours after their physical condition improved.

Glucose appears pathologically in the urine when (1) the blood-sugar is 0.3 per cent. or more (this may be due to the ingestion of more than can be stored or to the storage of more in the blood than the body can use; hence the kidneys excrete it), (2) kidney retention ability is reduced, or (3) the glucose exists in some chemical combination rendering it unfit for use.

Clinically: (1) assimilation limit lowered as in mild diabetics

who show no sugar on carbohydrate-free diet; (2) excessive glucose formation as after certain cerebral lesions; (3) pancreas diseased or removed with practically excretion of all sugar ingested; (4) glucose collected in the blood is unused; (5) oxygen starvation from any cause; (6) following certain poisons as morphine; (7) after severe cooling of the body; (8) renal diabetes after increased kidney secretion as from caffeine, and this and the phloridzin type are the only ones without hyperglycæmia.

Pavy's experiments, while showing that the liver was not the only source of the sugar, yet forced him to admit that the liver was the main warehouse of glycogen. Claude Bernard first suggested that the liver regulated the blood-sugar by storing it up to be given to the muscles as demanded by their work, and he demonstrated the nervous control over the output of sugar from the liver when he produced glycosuria by puncturing the floor of the fourth ventricle. Sugars and starches of the food, after conversion by the intestinal enzymes into glucose, pass by the portal circulation to the liver, where the larger part is converted into glycogen.

Hopkins states that ductless glands are important in regulating carbohydrate metabolism. The islands of Langerhans furnish a necessary secretion for and the posterior lobe of the pituitary gland has an important influence on this process, because their disturbance causes glycosuria and limits sugar assimilation. Glucose is the blood-sugar, being a food material in transport from organs of supply to organs of use, and its concentration normally varies from 0.06 per cent. to 0.11 per cent., with an average of 0.085 per cent. Hyperglycemia and glycosuria result from disturbed equilibrium of that chemical or nervous mechanism controlling the sugar supply from the glycogen depots, (1) physiologically, as alimentary, nervous, etc.; (2) pathologically, as in diabetes, gland secretion changes, cerebral injury, and peripheral nervous disease; and (3) experimentally, as by drugs, splanchnic stimulation, etc.

Investigators are increasingly agreeing that true diabetes is due to a deficiency of the internal pancreatic secretion, and

they have experimentally proven this by the removal of portions of the pancreatic tissue in animals.

Weichselbaum describes specific changes in the cells of the islands of Langerhans in the diabetic human pancreas, but, according to Allen, no one has differentiated the diabetic from the non-diabetic pancreas in hospital post-mortem material.

Knowlton and Starling showed that the pancreas not only influenced the glycogenic function of the liver, but also had a decided effect upon the tissue utilization of the glucose. Von Noorden believed that hormones of the pancreas inhibited the liver's normal tendency to part with its glycogen and thus caused hyperglycemia through an overproduction of glucose, but that there was no lack in the ability of the tissues to utilize the blood glucose. Opie showed that a majority of his cases had degeneration, with atrophy, of the cells in the islands of Langerhans. Eustis states that it has been thoroughly accepted that the pancreas secretes a hormone that is absorbed by the blood and controls the glycogenic function of the liver, and that anything affecting this cycle causes glycosuria, maltosuria, or galactosuria, depending upon the carbohydrate eaten.

The normal island cells are of two types, alpha and the more numerous beta, and Homans has demonstrated, by special granule stains, that the beta cells show the exhaustion and degeneration; hence the thought that the specific secretion of the beta cells is concerned in carbohydrate metabolism. He has shown that, though the islands appear normal, some of the beta cells show typical hydropic degeneration in human diabetics. These patients have a diminished power to use glucose: they eat, digest, and absorb, but do not assimilate it normally.

Diabetes is a specific disorder of nutrition and diminishes the ability of the body cells to resist infections, repair injury, or withstand ordinary wear and tear. The carbohydrate diet must be maintained within the limits of the individual's tolerance, which is found to vary greatly. The renal permeability differs, and, when glycosuria is stopped, the blood-

sugar may remain above normal for indefinite periods. While nervous influences may cause glycosuria, they rarely, in themselves, cause permanent diabetes.

According to Macleod, medical knowledge has been advanced because of the closer affiliation of clinical and laboratory workers. The laboratory has shown that conditions exhibiting many of the symptoms of human diabetes can be induced in animals by a multitude of causes, and that we do not deal with a pathologic entity, but with a variety of conditions having only certain common symptoms. Glycosuria, the most characteristic symptom, may be due to local interference of renal function or may not appear until after the diabetes has become well established; hence it is thought that hyperglycæmia is a more reliable criterion. We must remember the physiologic conditions which govern the relationship of hyperglycæmia and glycosuria. It has been commonly taught that the kidneys do not permit any blood-sugar to escape into the urine until the percentage has risen considerably above the normal, but there must be some change in the excretory function of the kidney as a result of the diabetes, for the same degree of hyperglycæmia causes more glycosuria in a diabetic than in the normal man. Jacobsen, giving 100 gm. of dextrose to normal persons before breakfast, found an evident increase in blood-sugar in five minutes, also that this hyperglycæmia became more marked and reached its maximum in thirty minutes, returning to normal in two hours. He found six of fourteen persons showed glycosuria after taking 100 gm. of starch and eight of fourteen after taking 100 gm. of dextrose. This shows that the maintenance of the blood-sugar at as low a level as possible in diabetes requires careful regulation of the ingested amounts of sugar and starch foods, keeping below the tolerance limits and using those that are slowly broken down.

The earliest indication of derangement of the carbohydrate metabolism is that the post-prandial hyperglycæmia is greater and persists longer than normal. This gradually becomes a continuous hyperglycæmia, which is maintained at a fairly constant level for some time by the overflow of the sugar excess

into the urine. Ultimately the kidneys become less permeable and the hyperglycæmia increases. Thus early diabetics may show glycosuria only after taking food; the mixed twenty-four-hour specimen may react normal, while a specimen voided one or two hours after a meal may react positive. Practically post-prandial glycosuria must be considered the initial symptom of diabetes, provided excessive amounts of sugar have not been taken; and the diet must be changed to retard the development of an incipient into a serious case.

Most temporary types of experimental hyperglycæmia are dependent upon stimulation of the nervous system exercising control over the glycogenic function of the liver. Excessive hepatic glycogenolysis occurs in the first stage of both temporary and permanent experimental diabetes; hence we should understand the nature of the factors controlling the glycogenic function of the liver and the conditions that may lead to a failure of this control. A certain nervous element is shown by the frequent occurrence of diabetes in those predisposed to neurotic conditions, those daily under nervous strain, those with aggravated symptoms shown after a nervous shock, and the apparent increase in men whose occupations demand mental concentration and strain. Glycosuria was found in four out of nine students after a severe and in only one after an easy examination. Twelve out of thirty-five of a famous football squad, after a keenly contested game, showed glycosuria, and five of these were substitutes who did not get into the game; hence here due to nervous excitement and strain.

Experiments have shown the splanchnic nerve conveys certain stimulations from the medulla, but this fails to produce increased hyperglycæmia after the extirpation of the adrenals; hence this stimulation of hepatic glycogenolysis is believed to require the secretion of the adrenal hormone into the blood. Hypersecretion of epinephrin occurs in deep emotion, fright, fear, etc., and these lead to hyperglycæmia, though we are uncertain as to the mechanism by which the nerve impulse brings about the increased glycogen changes.



Pancreatectomy has experimentally simulated true diabetes; leaving as much as one fifth to one eighth of the pancreas is commonly followed by a mild type, while if only one ninth is left severe diabetes rapidly develops. Tolerance of carbohydrates distinguishes between mild and severe pancreatic diabetes, as glycosuria develops only in mild form with the use of carbohydrates while it is present in severe forms on a flesh diet. Allen believes that continued feeding with excess of carbohydrates will convert a mild into a severe form; hence considers diet regulation necessary. It has been clearly shown that the pancreas is essential in the decomposition of carbohydrates in the normal animal, but its exact action is unknown. Pancreas removal causes a sweeping out of all but traces of glycogen of the liver and no further storage occurs even with excess feeding of carbohydrates. The glycogenesis of new sugar out of the carbohydrate molecules occurs and the tissues become unable to burn sugar, as is shown by the respiratory quotient, which is the ratio between the carbon dioxide expired and the oxygen absorbed. Adding dextrose to the blood of a normal animal raises the quotient almost to unity, but has no effect upon the blood of a diabetic animal.

Diabetes has an overproduction of sugar with an abolition of the tissues' ability to use it. The amount of the blood-sugar and the extent and character of the respiratory exchange are believed to be the most reliable indices of the severity of the disturbed carbohydrate metabolism in the diabetic, while the degree of the glycosuria alone is liable to cause serious errors in judgment.

Hopkins used Bang's micro method in determining the blood-sugar, but this would be difficult, if not impossible, to use in life insurance work.

The following is a rapid bedside method:

1. Place two or three drops of blood from a finger prick on a weighed piece of filter paper, and weigh again to obtain the weight of the blood.
2. Drop the filter paper into a test-tube containing 6.5 c.c. alkaline solution of potassium chloride, which has been



brought to a boiling point, and keep thus for a half hour, during which time the albumin coagulates and the sugar dissolves.

3. Pour the solution into a small flask, wash out the rest of the sugar with another 6.5 c. c. potassium chloride solution, and add to the flask with 1 c. c. of a specially prepared copper solution; bring the mixture to a boil in a half-minute and keep there for two minutes.

4. Cool, add few drops of a special starch solution as an indicator, and titrate with a hundredth normal iodine solution until the blue iodine starch color appears and remains for a half-minute.

Sugar may accumulate in the blood owing to impermeability of the kidney; hence the blood examination should supplement that of the urine. Increased blood-sugar is the most characteristic sign of disturbed carbohydrate metabolism and the alimentary test is of value. The rate of absorption from the stomach is important, and sugar toleration is increased by an accompanying meal. Tachau found only very slight increase in normal cases after ingestion of 100 gm. of glucose; hence this has been taken as the standard.

Hopkins's conclusions are, in part, as follows:

1. Moderate rise (0.14–0.15 per cent.) of blood-sugar in health occurs after feeding 100 gm. of glucose, reaching its height in a half to two hours and quickly subsiding.

2. There is no constant blood-sugar level at which sugar appears in the urine.

3. Absorption after rectal and subcutaneous injection is slower than after feeding by the mouth.

4. Disturbed carbohydrate metabolism may exist with a normal sugar concentration associated with a most pronounced alimentary hyperglycemia.

5. Alimentary hyperglycemia is pronounced in diabetes, reaching its height in a half to three hours after the glucose is ingested and lasting longer than in other conditions.

6. Pancreatic, nephritic, and pituitary cases all furnish very high figures after feeding glucose, the duration lying between that of normal and diabetic patients.

Formerly the reduction of Fehling's solution on boiling with urine was considered a positive sign of diabetes mellitus, but many such persons outlived expectations and later showed no sugar in their urine.

Diabetes mellitus shows failure of the entire body to utilize the blood dextrose, and a predilection for fat and proteid fuels in preference to carbohydrates with the formation of beta-oxybutyric acid, acetone, diacetic acid, etc. Incomplete proteid combustion or excessive proteid putrefaction in the intestines can cause an acid condition in the blood like that in diabetic coma. We must remember that 50 per cent. of the proteid molecule is transformed into glucose in the body metabolism and for every gram of nitrogen in the urine 5 grams of glucose are burned up in the tissues or excreted in the urine, and that this proteid cleavage must be considered in outlining a diet. The amount of glucose excreted is of much less importance than the amount of diacetic acid, beta-oxybutyric acid, acetone, and indican in the urine. Cane sugar, by alimentary digestion, forms glucose and levulose, and, though their chemical structures differ, they both promote a similar glycogen storage in the liver; and this possibly explains the increase in glucose output when a diabetic is fed levulose.

Most of the dextrose is thought to exist in some loose combination (physiochemical) with certain blood constituents, and this combination is essential for its utilization by the tissue cells. The chemical evidence points to the blood-sugar being in a free state, but on biologic grounds it appears to be combined with a colloid.

The pancreatic internal secretion acts as an amboceptor to link the dextrose molecule to the tissue cells, and the failure of this amboceptor allows the free sugar to pass over into the urine as in diabetes.

Apparently, in true diabetes there is a constant uncontrolled production of sugar in the organism itself with the accumulation of excessive amounts in the blood independent of the carbohydrates ingested.

Lusk gives the dextrose nitrogen ratio as 3.65 in the severest

human diabetes, but pancreatectomy in a dog gives only 2.8 ratio, while phloridzin gives 3.65 ratio in both man and dog, and thus illustrates the difference between clinical and experimental diabetes.

Abnormal renal function is the rule in severe diabetes as evidenced by an oedema tendency associated with salt retention and the urea generally above normal.

Diabetic patients are said to die in coma and animals in cachexia, and the stoppage of overfeeding of human diabetics will cause fewer deaths in coma. Allen found prolonged fasting in severe diabetes caused the glycosuria to cease with practical loss of acidosis as shown by clinical symptoms; the coma symptoms cleared promptly, ketone and ammonia excretion fell rapidly, carbon dioxide of the blood rose about to normal, and all remained thus on the strictest carbohydrate-free diet. Exercise must be used judiciously after threatened acidosis has been removed, as overexertion has been known to produce coma, probably in cases with considerable glycogen.

The Naunyn School insists that the essential feature of acidosis is diminished alkalinity of the body fluids, while von Noorden has insisted that some diabetics die in coma when the urine has been constantly alkaline for some time.

Ketonuria implies increased concentration of acetone bodies in the urine rather than in the blood and tissues, but the latter are the more important. Clinicians consider sudden high ketonuria as dangerous, but collapse or heart failure, and not true coma, may cause the death. Probably patients do not show typical coma without acidosis, and Allen thinks we know nothing fundamental concerning acidosis, but application of improved methods may show diabetic intoxication to be a true acidosis. Acetic acid appears to be an intermediary product of foodstuffs and experiments show that its perfusion through surviving liver tissue increases the production of diacetic acid; hence it may promote acidosis, and it is therefore rational to warn diabetics with acidosis tendencies against the ingestion of acetic acid. Bradner and Reimann studied 214 consecutive cases in Dr. John B. Deaver's clinic and found 85

per cent. eliminated acetone in the urine, more being found the more emotional, frightened, or anxious the patient; 23.3 per cent. were before and 61.7 per cent. after the operation. The elimination ceased in many cases after the third day.

Addis believes it is dangerous to give diabetic patients a sugar- or starch-free diet before major surgical operations for this increases the danger of coma. The special danger to life is the failure of fatty acid metabolism, as the urine of fatal cases contains large quantities of unoxidized fatty acids. The amount of acetone excreted does not give reliable information, as small amounts may be due to a small ability of that person's system to deal with such substances. The fatty acids are not much disturbed until the stored glycogen has been used; hence glycogen storage should be promoted.

Fat, carbohydrate, and protein are pathologic in urine, it being a question whether detectable amounts are ever normally present, and the border line is hard to determine. The kidneys normally prevent any noteworthy loss of fat from the blood serum. Most surgeons still restrict themselves to operations of necessity, at times delaying until the sugar has been removed, but asepsis has materially increased successful results.

Blood-sugar and spinal-fluid-sugar are said by Neuberg to be of equal content, but Hopkins found the blood-sugar, in health, to average about 10 mg. higher per 100 c.c. Spinal-fluid-sugar content study has shown it is of more value in meningitis and syphilis than in diabetes.

Thannhauser and Pfitzer used 7 per cent. glucose solution, injecting intravenously 500 c.c. (35 gm. glucose), and found normal persons excreted a trace of sugar in the urine after 20 gm., and this was but slightly affected by a markedly increased injection. Mild diabetics acted the same as normal individuals, but severe diabetics excreted all the injected sugar in the urine and maintained for hours the increased percentage of the blood-sugar, the carbohydrate depots apparently being unable to store up the excess.

Gitlow and Horowitz describe a rapid clinical test, as useful

as Fehling's, for blood-sugar, which is used like Molisch's original test:

Add 2 drops of 15-20 per cent. solution alpha-naphthol, or of thymol, to 2 c.c. of urine, or the solution to be tested, mix well, and add 2 c.c. concentrated sulphuric acid. The alpha-naphthol produces a deep violet and the thymol a deep red color, the difference between normal and hyperglycemic blood being very marked.

Purjesz claims the amount of glucose in the blood, in health, is from 0.0451 to 0.087 gm. per cent., and that variations do not occur under like conditions in the same individual. Normally it is mostly in the plasma.

In some cases Tachau found a distinct rise in the sugar content after the blood had stood an hour, thus adding force to Lepine's assumption that the blood-sugar existed free and combined. Blood of a fasting patient showed more sugar in the plasma, therefore the whole blood is better in the study of alimentary hyperglycæmia.

Kahler found a distinct rise in blood-sugar just before or during menstruation with a return to normal after the flow had ceased, but has not determined the cause or whether it was a real or apparent hyperglycæmia. None remained normal in twenty-two cases, and this condition must be kept in mind with females. May be due to some changes in hepatic function, as Chvostek has found evidences of hyperæmia of the liver during menstruation.

Bing and Jacobsen, using Bang's method, found the normal percentage of blood-sugar between 0.06 and 0.12 with an average of 0.1. They found no direct relationship between the degree of hyperglycæmia and glycosuria, though in some cases of glycosuria and diabetes their results were of prognostic value.

Maase and Tachau, determining blood-sugar, found the polariscope results a trifle higher than the reduction tests, with the silver solution giving higher than the copper.

Menke, using Bang's method, and making hourly determinations of the blood-sugar of the diabetic, found great

variations which were influenced by the food taken and the kidney activity, as the blood-sugar was lowered as the sugar excreted by the kidneys increased. There was no parallelism between glycosuria intensity and the height of blood-sugar concentration. While the fasting value was often high, the differences were too small in moderate or severe cases to serve as any basis. Noon was found to be the most suitable hour for the blood-sugar determinations, but they were of little value in estimating the results of a carbohydrate cure. Wolf and Gutmann, using Bertrand's method, in thirty-five cases of diabetes on a carbohydrate-free diet, made a simultaneous study of the blood-sugar and acetone bodies in the urine; six of the cases also had chronic nephritis. The twenty-nine non-nephritic cases on carbohydrate-free diet showed decline in blood-sugar according to the severity of the case, four becoming normal while the others reached a surprisingly consistent concentration level.

The six nephritic cases showed blood-sugar amounts according to the type of the renal disease, and all retained hyperglycæmia though the glycosuria disappeared.

Lampert found the creatin excretion materially decreased in diabetics and nephritics.

The secretions of ductless glands may reach the circulation by direct transference from the gland cells or indirectly through the lymph stream. Epinephrin apparently goes direct into the blood. Biedl reported frequent glycosuria in animals where the thoracic duct lymph was kept from the general circulation and he thought this demonstrated the lymphatic path for the pancreatic internal secretion, but Carlson and Drennan's experiments disagreed with this conclusion and they believed there was a direct entrance into the blood.

Galambos and Tausz found hyperamino-suria in disturbed internal pancreatic secretion as well as with impaired liver functions. Results of their experiments confirmed their theory that the catabolism of proteins to their normal end-products requires pancreatic internal secretion, and its insufficiency



leads to hyperamino-suria, an analogous phenomenon to glycosuria.

Cecil studied ninety cases of diabetes and found sclerosis in sixty and hyaline degeneration in the islands of Langerhans in thirty. He records six non-diabetic cases with the islands of Langerhans showing hyaline degeneration, all being over thirty-seven years of age. He believes diabetes ensues when enough islands are involved to interfere with carbohydrate metabolism. Landau observed nine cases of carbohydrate metabolism while influenced by subcutaneously injected adrenalin. He found glycosuria ensued with marked hyperglycæmia if considerable glucose was given and followed by adrenalin, and that small doses of cocaine increased this effect.

Anders and Jameson reported a case of pituitary gland trouble with history of typical acromegaly for four years and glycosuria for two years. They record 246 investigated cases in which 183 urinary findings showed 28 cases of glycosuria; 16 of 88 pituitary acromegaly cases showed sugar in the urine, while Borchard found 63 of 176 acromegaly cases were diabetic. The pituitary pars anterior has to do with skeletal growth and the pars posterior directly with metabolic processes, especially with carbohydrate assimilation. An excess of the posterior lobe secretion causes an intolerance for carbohydrates.

Roger describes the chemical composition, technique of determination, and results of research on glycuronic acid in health and disease. It neutralizes the toxic action of a number of substances, the toxic element combining with the glucose and thus is made harmless. Since this neutralization occurs in the liver, the amount of glycuronic acid in the urine is a gauge of the liver functional capacity, for low glycogen reserve makes low glycuronic acid. Brown and Smith studied the normal diastase content of the urine and concluded there were well defined limits, and that marked decrease in amount with no renal disease strongly suggested pancreatic trouble.

Barringer decided that exercise increased carbohydrate tolerance in milder forms of diabetes, but lowered it in severe types and might even precipitate coma. He arranged a bar



and dumb-bell exercise system whose effects could be checked by an accurate test of the heart's functional capacity. A forty-two-year-old professional man with mild diabetes had been declined for insurance in 1909 on account of glycosuria. His urine was kept practically sugar-free for four years, but his carbohydrate tolerance had decreased from 360 to 150 gm. of white bread in twenty-four hours in June, 1913, and to 120 gm. in September, 1914. Exercises, outdoor living, vegetable days, etc., had been followed, and in December, 1915, his tolerance was 195 gm., or only about one half what it was six years earlier. Falta advises a mixed starch diet in diabetes to combat the acidosis, giving the carbohydrates in gruels, or soups of rice, corn, barley, tapioca, potato, spaghetti, noodles, and starchy bread or crackers. The variety enables more prolonged use over a monotonous diet, and he interposes vegetable or fasting days. Theoretically, animal albumin diminishes glycogen formation in the liver; hence more sugar passes through into the blood and diabetics cannot use this sugar because of pancreatic insufficiency. Persistence in the diet leads to permanent improvement. A famous American physician on "How to Live to Old Age" said: "Acquire a chronic disease and take care of yourself," but the majority of individuals with a chronic disease, weakened and undermined in health, die of acute superimposed infections or complications. Foster states that therapeutics directed to etiological factors is now almost unknown in the realm of chronic disease. The diabetic can no longer eat or work with his brother man. His every human privilege must be adapted to a narrowed function. Infections directly or indirectly precipitate coma in about 78 per cent. of the deaths, pneumonia being invariably fatal. The diabetic must be kept in a condition approximating normal vigor. Diabetics that can be made to show sugar-free urine only at the expense of nutrition are not resistant, and one danger has been substituted for another. The average case has more comfort and resistance with sugar-free urine. A majority of the middle life cases with severe glycosuria without acidosis regain strength and energy if the glycosuria is

controlled. Sugar-free urine does not always indicate that the diabetic tendency has been cured, but the percentage of blood-sugar is the criterion of the body's ability to handle sugar. Maximal normal is 0.14 per cent. and threshold of renal permeability is 0.16-0.17 per cent. Unless the blood-sugar can be reduced below 0.16 per cent., the case is grave no matter what the urine may show.

Young adults (under 35 years) coming under observation in one or two years after the disease was recognized, have secured sugar-free urine, and all who have followed advice have recovered and increased their carbohydrate tolerance above that at beginning treatment. Advanced cases have not shown good results; the glycosuria may be easily controlled, but the blood-sugar is hard to reduce to normal and requires severe restrictions to hold there. Most of those adhering to a diet have died of infections or complications with coma as a sequel, and those not dieting rigidly have died in coma, both groups showing an average life of two years after beginning treatment. Thus advanced cases in young persons give very discouraging results, and it will take years to show whether the early cases will remain without glycosuria and with normal blood-sugar or will deteriorate and become typically advanced cases. We must attain sugar-free urine, blood-sugar as near normal as possible, and an absence of acidosis. The chief peril is the relaxation of vigilance by the patient and physician. Acidosis is the danger and, if this tendency is once established, it is prone to recur. Starvation tends to induce acidosis in diabetics as in normal persons and is best conducted in hospitals in which are made frequent tests of the alveolar air, the blood, and the urine. Early cases must be kept free from glycosuria to raise resistance and avoid acidosis, and this can be done by the use of restricted low diets. Advanced cases of glycosuria must be controlled to regain normal vigor and weight. The chief difficulty is the necessity of constant vigilance over many years. Stillman states that the object of diabetic treatment is aglycosuria. Carbohydrate withdrawal, fat excess, and prolonged fasting were thought to

precipitate acidosis. Glycosuria may disappear with a few days of complete fast, but acidosis control is more difficult, and its presence is the controlling factor in the course of treatment. Acidosis means a decreased alkaline reserve of the blood rather than an increased acidity. Blood alkalinity is chiefly maintained by the bicarbonate contained, and this may be indirectly estimated in terms of carbon dioxide tension of alveolar air or directly by the blood plasma power to combine with carbon dioxide.

The urine tests are valuable for excretory phases, but give no index of the accumulation in the blood; hence the value of the blood tests. The tests for acetone, diacetic acid, ammonia, and total acidity are valuable so long as excretion keeps pace with formation, but with imperfect elimination, as in diabetes, this cannot occur; hence these tests may not reveal the degree of acidosis present. The analysis of the blood bicarbonate, as determined by the power of the plasma to combine with carbonic acid, offers an accurate measure of the accumulation of fixed acids, giving a true index of the acidosis present. Stillman's experience indicated that all cases of diabetes may be treated by the fasting method safely and with benefit when the degree of acidosis present is determined daily by the analysis of the blood bicarbonate.

Christian reports that the Allen starvation method for rendering a diabetic sugar-free, in addition to being safe, has materially shortened, by one or two weeks, the hospital time required to get a patient sugar-free, and thus permits a large part of the hospital stay to be devoted to building up his carbohydrate tolerance. Bookman records results agreeing with Allen in twenty-four cases of severe diabetes under starvation treatment. They rapidly became sugar-free and most improved in every way, the juveniles showing the most convincing results. He found the method perfectly feasible in private practice. Berkman reports, from the Mayo Clinic, the best results in removing glycosuria by the Allen method. Allen advocated fasting to control glycosuria and ketonuria on the theory that diabetes is due to overtaxing a weakened pancreatic

function, and worked it out on animals first. Fasts are continued until glycosuria disappears and then 24-48 hours longer. Alcohol, being a food that does not produce glycosuria and that is said to reduce ketonuria, is generally given during fasting, especially if there is danger of coma, and alkalies may be used for the first few days if coma is imminent. Feeding is begun cautiously to learn carbohydrate tolerance and clear up last traces of acidosis, and then learn protein tolerance. The ensuing loss of weight is usually beneficial, and regaining weight is all right so long as without glycosuria, and this is the fault with the weight-building methods. The severe diabetic may be very thin and weak because he cannot metabolize enough food to be well nourished and maintain strength. He is all right so long as he is not overtaxed, but attempts to build him up with foods he cannot metabolize merely hasten fatal results. He records twenty-seven cases, ranging in age from ten to sixty-nine years and of all grades of severity; every one was freed from glycosuria and acidosis; three have died, two being untreated, one died from heart complications, and one was in coma when admitted to the hospital. The fatal treated case was a twelve-year-old boy who did not follow directions. Observation of the cases has not been long enough to give permanent results.

Hill and Sherrick found the Allen treatment simple, safe, and efficacious in making and keeping patients sugar-free in much shorter time than the older methods. Some of their cases were young people with severe diabetes whom they had treated before by old methods and could not get sugar-free.

A patient entering the hospital is put on house diet without extra bread or potatoes and kept thus for two days to determine his tolerance for ordinary diet and the severity of his diabetes. The third day he is put to bed and given nothing but black coffee with 1 oz. whiskey every two hours from 7 A.M. to 7 P.M., making 7 oz. whiskey, in all 800 calories. If there is much acidosis shown by the amount of diacetic acid and acetone in the urine, sodium bicarbonate is given. The patient is kept on this diet till sugar-free, usually taking two and a

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half or three days. The loss of weight is slight, the relief of symptoms is very marked, and they have never seen symptoms of acid poisoning in their cases. A vegetable day is given as soon as the patient is sugar-free; vegetables of not more than 5 per cent. carbohydrates, boiled twice, with carbohydrate content of about 15 gm. after boiling. After a single vegetable day the diet is changed to one with a carbohydrate content of 15 gm., protein 25 gm., and fat 150 gm. This diet is slowly raised, increasing first the fat, then protein, and then carbohydrate; fat never raised above 200 gm. or 2200 calories. The patients hold their weight, feel well, and usually remain sugar-free.

The essential points brought out by the Allen treatment are:

1. It is not dangerous to starve a diabetic, and two or three days of starvation almost always make a patient sugar-free.
2. The diet must be raised very slowly after starvation.
3. An excess of proteid must be regarded as capable of producing glycosuria.
4. It is not desirable for all diabetics to hold their weight.

Peabody writes that clinical medicine has substituted the physiological for the anatomical, and the diagnosis problem now is to know, through functional tests, what an organ is doing.

Experiments have shown that respiration depends on the reaction or the hydrogen-ion concentration of the blood, and that any tendency to increased acidity stimulates the respiratory center, thereby increasing the ventilation through the lungs.

( Normal blood reaction, which is very slightly on the alkaline side of the neutral point, has, like the temperature, been called one of the physiological constants. Life itself depends upon the maintenance of the reaction of the blood and tissues within very small normal limits, possibly within the tissue cells, for metabolism most probably is intracellular. The normal blood reaction is maintained by the blood's chemical composition and the means at its disposal for the rapid excretion of acids. Carbon dioxid passes out of the blood in the pulmonary capil-

laries into the alveolar air until its tension is equal in the blood and air; hence the expired air content of carbon dioxid is an index of the acidosis. The acidity of the urine is an index of the acids being excreted, while that of the blood or alveolar air is an index of the acids in the body. The carbon dioxid tension of the blood or alveolar air is fairly constant under normal conditions at rest and is decreased under pathological conditions with acidosis.

The normal tension of carbon dioxid in alveolar air by the Haldane method is 38 to 41 mm., and by the Plesch method it is 40 to 45 mm.

Probably due to the incomplete combustion of fats in severe diabetes, there accumulates in the organism large amounts of betaoxybutyric acid, aceto-acetic acid and acetone which ordinarily would be burned to water and carbon dioxid. This causes air hunger and coma in grave cases, as the acid production becomes so great that the kidneys and lungs together are unable to excrete enough acids to keep the blood reaction within normal bounds. The amount of ammonia excretion is the best urine index, but this depends upon its production in the body and its excretion by the kidneys, and, if either function is disturbed, the values obtained will not truly estimate the acidosis.

Falling alveolar air carbon dioxid indicates danger; the values between 35 and 30 mm. show considerable acidosis and demand direct treatment, those between 30 and 20 mm. indicate the patient is nearing the border line, and those below 20 mm. may suddenly become comatose. A constantly falling carbon dioxid tension is of great prognostic value, and the rise or fall is a good index of the effect of the treatment.

Richards found four cases of diabetes with marked acidosis that gave positive Wassermanns, and these were unaffected by antisyphilitic treatment. He found two diabetics with none or slight acetonuria and one case of non-diabetic acetonuria that gave negative Wassermanns. Further study is necessary to determine whether acidosis patients differ from non-acidosis ones in the condition of the blood serum in the Wassermann test.



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Joslin knows of no cure for diabetes and claims no patient as cured, though he believes life can be prolonged and that coma is an avoidable accident. He finds that the rise of the respiratory quotients of severe diabetics, following a prolonged fast, is encouraging. He traced 927, or 97.5 per cent., of 945 cases seen in private practice from 1894 to November 18, 1915, and 425, or 45.8 per cent., had died, the actual causes of death being known in all but five cases; 147 died without and 273 with coma, and he has tabulated his results as follows:

Age at Onset. Years	Fatal Cases. Number	Average Duration. Years	Living Cases. Number	Average Duration. Years
0 to 10	33	2.06	9	4.44
11 to 20	48	2.79	27	2.70
21 to 30	40	3.30	50	4.90
31 to 40	53	4.43	71	6.12
41 to 50	71	6.08	146	7.04
51 to 60	97	6.63	120	6.29
61 to 70	52	6.00	55	5.38
71 to 80	14	3.71	11	4.45
81 to 90	0	....	1	0.33

A review of the data from the registration area of the United States shows a steady rise in the deaths from diabetes in the quinquennial periods since 1900 for both sexes and all age groups.

### MORTALITY FROM DIABETES—MALES AND FEMALES. REGISTRATION AREA RATES PER 100,000 POPULATION.

MALES.									
Years	All Ages	No.		15-24	No.		25-34	No.	
1900-1904	80,615,422	8,672	10.8	14,813,264	570	3.8	14,594,411	734	5.0
1905-1909	110,392,580	13,720	12.4	20,744,148	910	4.4	19,762,293	959	4.9
1910-1914	135,789,685	21,821	14.0	29,758,695	1,435	4.8	27,654,370	1,532	5.5
Total	346,797,686	44,213	12.7	65,316,107	2,915	4.5	62,011,074	3,225	5.2
	35-44			45-54			55-64		
1900-1904	11,661,561	856	7.3	7,717,760	1,369	17.7	4,659,751	1,906	40.9
1905-1909	15,784,916	1,245	7.9	10,918,260	2,238	20.5	6,485,755	3,209	49.5
1910-1914	22,082,077	1,894	8.6	15,776,516	3,507	22.2	9,263,101	5,206	56.2
Total	49,528,554	3,995	8.1	34,412,536	7,114	20.7	20,408,607	10,321	50.6



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## FEMALES

	All Ages			15-24			25-34		
1900-1904	79,629,838	8,788	11.0	15,729,548	454	2.9	14,103,308	577	4.1
1905-1909	106,362,856	15,109	14.2	21,038,797	684	3.3	18,362,378	793	4.3
1910-1914	147,045,332	24,395	16.6	29,115,270	1,125	3.9	24,894,447	1,245	5.0
Total	333,038,026	48,292	14.5	65,883,615	2,263	3.4	57,360,133	2,615	4.6
	35-44			45-54			55-64		
1900-1904	10,668,777	692	6.5	7,223,329	1,360	18.8	4,668,149	2,318	49.7
1905-1909	14,316,725	1,070	7.5	9,920,850	2,348	23.7	6,213,192	4,141	66.6
1910-1914	19,861,369	1,616	8.1	13,997,217	3,733	26.7	8,566,790	6,465	75.5
Total	44,846,871	3,378	7.5	31,141,396	7,441	23.9	19,448,131	12,924	66.5

Pauli believes that diabetes mellitus is one of the constitutional diseases which must be corrected in the early stages, but that the exact cause of glycosuria and of diabetes has not been established. The results of urinalyses, in his company's laboratory, of specimens from all over the United States show that the percentage of samples in which sugar is found is steadily increasing. Therefore, he thinks that glycosuria, but not necessarily that diabetes, is increasing. It is uncertain how many of these glycosuria cases will become true diabetes, but proper and continued treatment will prevent that development in many and prolong the life of many others.

Otto May, discussing the subject of diabetes, stated that his company (The Prudential Assurance Company of England), during the decade from January 1, 1901, to December 31, 1910, had 76,333 ordinary branch death claims of which 1143 (or 1.49 per cent.) were due to diabetes. He believed that his results proved a much greater death ratio in those cases with a family history of diabetes, and especially was this ratio found higher in those dying under forty-one years of age.

Temporary glycosuria, or the finding of glucose in the urine of an apparently healthy person and then failing to find it on subsequent and repeated examinations three to six months later, is a problem of great interest in life insurance work. The practical point is, how many of these cases ultimately develop into true diabetes? Is the medical officer justified in recommending for a standard policy or for some rated form,

or in rejecting? Most companies had considered such cases as impaired, and therefore not entitled to regular rates. Alimentary glycosuria cases must present evidence of the ingestion, in the three or four hours preceding the passage of the urine, of a meal exceptionally rich in sugar to entitle such a classification. Glycosuria depends upon a diminished assimilation limit, and this may be temporary, progressive, or permanent. May deemed "test-meals of sugar" as the only safe way to determine the character of the glycosuria, and that a normal assimilation limit case should receive regular rates and from this action to rejection depended upon the degree of assimilation shown.

Hale White thinks that many cases of temporary glycosuria are due to imperfect applications of the sugar tests by the examiners and we must agree with this possibility.

Cammidge considers glycosuria not as a disease, but as a symptom of a disturbance in the chemistry of the body which may be due to a variety of causes, and we should determine the cause, if possible. He believes that alimentary glycosuria is due to a defective chemistry which tends to become worse as the person grows older; hence that applicant is not entitled to regular rates. He proposes an iodine coefficient test as a substitute for a test-meal, but this requires a properly equipped laboratory; hence is rather impracticable for life insurance work.

Mackenzie requires repeated examinations of the urine in glycosuria in an attempt to determine the character of the case, and he still holds the opinion that an applicant who does not alter his diet and on several later examinations shows no sugar, if otherwise satisfactory, is entitled to regular rates.

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THE ORDINARY MORTALITY OF THE PRUDENTIAL SINCE 1900 IS SHOWN IN THE FOLLOWING TABLE.

Years Inclusive	MALES			FEMALES		
	All causes	Diabetes	Per cent.	All causes	Diabetes	Per cent.
1900-1904	5,508	46	0.83	1,130	10	0.88
1905-1910	11,657	134	1.15	2,748	30	1.09
1911-1914	19,095	280	1.46	4,547	87	1.91

ORDINARY EXPERIENCE, 1886-1914—DIABETES DEATHS.

Duration	MALES			FEMALES		
	Number	Per cent.	15 yrs. and over	Number	Per cent.	15 yrs. and over
Under 1 yr.	21	4.1	11.1	12	9.4	14.0
1-4 yrs.	193	38.0	38.9	39	30.5	43.3
5-9 "	175	34.5	30.7	51	39.8	29.5
10-14 "	90	17.7	14.8	18	14.1	10.8
15 yrs. and over	29	5.7	4.5	8	6.2	2.4
Total	508	100.0	100.0	128	100.0	100.0

ORDINARY EXPERIENCE, 1886-1914.

Age at death. Years	MALES			FEMALES		
	All causes	Diabetes	Per cent.	All causes	Diabetes	Per cent.
15-24	2,943	27	0.91	899	5	0.55
25-34	8,567	99	1.15	2,548	25	0.98
35-44	10,216	114	1.11	2,143	23	1.07
45-54	8,479	126	1.48	1,575	25	1.58
55-64	5,612	80	1.42	1,081	36	3.33
65 and over	2,034	27	1.32	370	13	2.70
15 and over	37,851	473	1.22	8,616	127	1.47

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Dr. Wells—The subject of Glycosuria as related to life insurance is one of the most interesting and important before the Medical Department at the present time, and I am sure there will be a number who will wish to discuss this paper. It is certainly very gratifying that so many have attended the sessions this morning, and I very much wish and would make request that as many as possible remain to our afternoon session. We have some very interesting papers this afternoon, and evidence points now to an early closing of our session, so we will not keep you here, and I hope that everyone who is here at this time will remain to our afternoon session.

#### AFTERNOON SESSION

Dr. Wells—I will ask Dr. Martin to open the discussion of Dr. Patton's paper.

Dr. Martin—Mr. Chairman and Gentlemen—Inasmuch as the clinical side is the one that interests me perhaps more than the insurance side, I will be less able to quote figures than those that preceded me. I think the address of Dr. Patton and the very illuminating remarks of Dr. Pauli, Dr. Ogden, and Dr. Blakely have been very instructive, and they have left very little indeed to be said, so that whatever follows will be more the clinical side, with a few practical observations in regard to glycosuria.

From the practical point of view we have to ask ourselves, are glycosuric cases really insurable? If so, to what extent? Are any of these cases to be considered standard cases? Or are some of them substandard? Can we assure ourselves of any future for these cases that show definite signs of glycosuria?

In the first place I would like to say that I think that as Medical Directors we often get reports on urines that really have no glycosuria, although so reported, and it has been the experience of a good many laboratories that Fehling's Solution is in that way not reliable; most of the better laboratories in the universities, colleges, and hospitals are using Benedict's



test in preference to Fehling's. With Fehling's you may get reported as a trace of sugar what really is uric acid or creatinin, and the results are confusing. That occurs with Fehling's. It does not occur with Benedict's solution. Benedict's Solution is a one-bottle solution, not two, and in that way it is simpler and at the same time more reliable.

Are glycosuria and diabetes synonymous terms? That, too, is a disputed point which has not yet been settled. The tendency is to regard diabetes not as a disease but as a symptom, that is to say that glycosuria is simply an expression of a defective metabolic condition; just as jaundice is an expression of some trouble with the bile ducts, so glycosuria is merely a symptom, no matter whether it be very severe or very mild. It is nothing but an expression of the lower assimilation limit for carbohydrates chiefly.

Perhaps from an insurance point of view, in a general way, one could divide the causes into three groups. First, those which Ramsey speaks of as true diabetes, those in which there is glycosuria with constitutional symptoms—I mean by that loss of flesh, thirst, and any of the other symptoms included in the term diabetes. These may be acute or chronic, and as such, in either case, are certainly not insurable risks. Nor are they insurable even after a short period, because we never can tell at what time these cases might change to the severest of all types and end rapidly in death. Nevertheless, the newer treatment has demonstrated that even these very severe cases may be so controlled by treatment that the duration of life will be very much lengthened. Joslin's figures and Allen's figures are very convincing that with proper treatment, duration of life is very much lengthened. The statistics of the disease in Boston in the last ten years show a very marked difference from those of the previous decade. Life is longer in the diabetics in Boston where the influence of those two men has been very much more felt than elsewhere, and those statistics are, I think, very illuminating.

Apart from the severe cases, there are the mild cases which may be acute or chronic or recurrent. And then there are



the transient cases of glycosuria which we will speak of in a moment. All three types, the severe, the mild, and the transient, are due to the same immediate cause, namely the functional disturbance, but the remote cause differs, and that is where, in insurance, we need to study the conditions. According to the cause, so is the prognosis, and so is the insurability. For example, glycosuria, as we all know, is very common after fevers, a temporary glycosuria. It is very common with dietetic errors. It is extremely common under nervous conditions in healthy people. A number of students were recently examined, just before their examination time, and they had glycosuria. When the examination was successfully passed, the glycosuria had disappeared. Cannon, of Boston, has repeatedly found that nervousness has a great deal to do with producing glycosuria, and thus it would appear that in otherwise healthy people, this should not render a risk uninsurable.

If then careful clinical observation shows these cases to be transient and due to an acute and immediate cause, and disappearing with the ordinary regimen, these cases deserve very lenient consideration and practically are standard risks.

Then there are what we call mild cases. By mild cases one refers to a moderate amount of glycosuria controlled by diet and proper treatment over a short period of time. Now these mild cases either have a definite cause like cirrhosis of the liver, or exophthalmic goiter, or many of these other fundamental causes, and these it would seem should be treated not from the standpoint of glycosuria but from the standpoint of the underlying cause. The other mild cases of diabetes and glycosuria, in which no cause can be found, should be regarded as diabetes, and the prognosis and the insurability should depend on two things, first the extent to which they can absorb large quantities of carbohydrates, and secondly, the extent to which one can depend on their following the directions of their physicians. The second feature of course makes the insurability a difficult problem in any case. If no cause exists or can be found, then the condition should be regarded

as more serious even than whether the treatment helps. With regard to the mild cases of so-called pure diabetes, as everybody knows, age makes a great difference. Those over fifty usually last much longer, they are more mild, more chronic, and therefore need not be taken so seriously. Of all the cases that died within the first year of showing sugar, nearly one half were under twenty years of age. The mortality, however, after twenty, is now known to be unnecessarily high, because the cases have either not been properly treated or have not wished to follow directions. Diabetics live, however, often much longer than one realizes, perhaps, and I will just quote from one of Dr. Joslin's tables a few of the figures which may perhaps be of interest to you:

<i>Age</i>	<i>Amount Sugar</i>	<i>Still Living after</i>
29 years	1.8	18 years
39 "	2.	15 "
54 "	4.2	12 "
29 "	3.2	7 "
48 "	5.6	10 "
22 "	4.8	30 "
8 "	1.8	29 " (in coma)

showing that glycosuria in itself is not always such a fatal thing as one might believe. There is one interesting case which he made the subject of a special paper—a child 8 years of age who at that time had 1.8% of sugar in the urine, and at 29 years of age died in a diabetic coma, so that for twenty-one years this child had diabetes.

I have picked these out as among the more favorable figures in his list of some thirty-odd cases that he dealt with.

Mild cases of diabetes with moderate amount of sugar in the urine, if they have no heredity, that is, if in their heredity they have no history of diabetes (one third of all diabetes are hereditary), if they have no history of that, or of gout, or of tuberculosis, or of nervous affections, then the risk can be considered of course all the better.

The question was raised this morning as to whether diabetes can be cured. It depends entirely on what you mean by diabetes, and what is more, until we know a great deal more about the results of modern treatment, we are not in position to discuss that point. But what we might call secondary diabetes is of course curable, I mean by that, glycosuria that comes secondary to a well-defined cause. One patient, for instance, that I happen to have known of in the last dozen years, had 6% of sugar in the urine associated with gallstones and some occlusion of the pancreatic duct. The patient was operated on, the gallstones removed, and the sugar disappeared, and the patient after two years or more is perfectly well, having maintained good weight, and is in very excellent condition.

Syphilitic cases or infectious cases or traumatic cases are all of course secondary types in that sense, and are therefore insurable unless some further complications have arisen.

Untreated diabetes tends to progress. Treated cases can have their lives made much longer if they pay proper attention to the modern means of treatment.

One of the interesting features about diabetes in connection with life insurance is this: as we all of course know, many diabetics are detected during the course of a life insurance examination, which means that they were in good condition when they were detected. Those are the patients that live so much longer, because they were examined in perfect health apparently, but had their sugar. If they are put on proper treatment and adhere to it, their lives of course will be much longer than those who have been negligent in the régime.

Among 287 cases in the Joslin series, 57 were detected at life insurance examinations. Fifty-seven patients apparently healthy coming for insurance were found to have sugar and were put on treatment. They were mostly over thirty years of age, but many of them were severe cases. Of those cases 88% are still living, because they were treated promptly and naturally were better under such conditions.

Just a word about the tests, and then I have finished. The twenty-four hour specimen of urine is after all a pretty good index of what a patient's sugar condition, so to speak, is, but that of course has to be guided somewhat by the diet. The study of the blood sugar is of paramount importance, and it would be an ideal thing to have the blood repeatedly examined for hyperglycæmia in every case, but that is a clinical impossibility, except by experts in a well-equipped laboratory. In the treatment of diabetes, we are not very certain of our ground and changes in our viewpoint are frequent. We used to think that the oatmeal cure was of great importance, and it has only been recently shown that this form of treatment was based on a false idea. It is really the previous starvation that makes them free from sugar, not the fact that the starch of oatmeal is different from any other starch. We are really in a very tentative stage, but one thing is certain, that the life history of a patient with diabetes is nowadays much longer than it was, and those who care to do a conscientious substandard business without seeming to run a gambling hell, so to speak, might well consider them as eligible risks in many instances.

Dr. Wells—I will ask Dr. Blakely to continue this discussion.

Dr. Blakely—First of all I should like to express my appreciation of Dr. Patton's interesting presentation of this extremely difficult and yet important subject. So much has been written in the past few years about diabetes and glycosuria that it must have been hard to select the most important things to discuss in his paper.

The treatment of diabetes has been so absolutely revolutionized in the past three years that every medical practitioner is keenly interested in the subject and those who have seen most of the Allen treatment are the most enthusiastic over the brighter outlook for this unfortunate class of patients.

The scientific part of the subject I do not feel competent to discuss. When Dr. Patton or others speak of postprandial hyperglycæmia, the alpha and beta type of cells in the Islands

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of Langerhans, the respiratory quotient, the dextros-nitrogen ratio, the ketone bodies, blood-fat, the pancreatic amboceptor, and other equally important topics, I prefer to listen and not expose my ignorance by talking.

Glycosuria is one of the most practical of our everyday life insurance problems and one which is ever with us. A few things which Dr. Patton has said seem to me to deserve even more emphasis than he has given them. He has referred to diabetes as "a specific disorder of nutrition" which "*diminishes the ability of the body cells to resist infections*, repair injury, or withstand ordinary wear and tear." Allen has called diabetes "a weakness of a bodily function—the function of assimilating certain foods." It is peculiarly dangerous to the average man because there is no early or painful symptom to warn him of trouble. One writer has said: "if a person overtakes a weak stomach, the resulting distress forces him to desist; if he overtaxes a weak pancreas, nothing but intelligence can show him what is wrong."

The number of deaths from diabetes is not always a fair criterion of its prevalence for while it may not be reported, or even recognized, as a contributing cause of death, its presence may have been an important factor in the lowered resistance of the individual who succumbs, perhaps, to some acute infection. Joslin in his recently published book on diabetes has tabulated the causes of death in 420 cases seen in his private practice in the twenty-one years—1894–1915 inclusive. 64% of these deaths, 273 in number, were due to diabetic coma, and coma, you will recall, is one of the things to be abolished under the new treatment. The remaining 147 cases were divided as follows:

Pulmonary tuberculosis.....	16 or 11%
Cancer.....	17 or 12%
Acute infections, including tonsillitis, pneumonia, influenza, sepsis, carbuncle, appendicitis.....	36 or 24%
Cardio-renal and vascular disease.....	62 or 42%
Miscellaneous, including suicide, drowning, senility, cirrhosis, anæmias.....	16 or 11%
	<hr/>
	147 100%

The striking thing in these groups is the large number of deaths from acute infections—24%. This figure is just about double that of the New England Mutual mortality experience for the past five years. These same causes gave us a trifle under 12% of our total deaths.

A good deal has been written about "the strenuous life" or the strain of modern life as a causative factor in diabetes. Another term which is applied frequently is "emotional glycosuria."

An interesting bit of experimental work on emotional glycosuria was done in Boston five years ago. Dr. Cannon, Professor of Physiology in the Harvard Medical School, produced glycosuria in a series of twelve cats by fright or rage. In reporting his experiment he referred to certain clinical data indicating an emotional origin of some cases of diabetes and added, "the intricacies of existence and the complications of disease in human beings throw some doubt on the value of this evidence; it is desirable, therefore, that the question of emotional glycosuria be tested under simpler and more controllable conditions." His conclusion is thus summarized: "When cats are excited for even so short a time as one half hour, either by being bound in a comfortable holder or by being caged and barked at by an active dog, they exhibit glycosuria. Fright or rage in the animal is the essential element in the results." (The amount of sugar per kilo of body weight during twenty-four hours, which included the period of excitement, averaged 0.26 grams and the maximum was 0.62 grams. Animals who had had glycosuria failed to have it after careful adrenalectomy although subjected to the same conditions as before and for two or three times as long a period and although they still showed the same excitement as before. "Since splanchnic stimulation produces glycosuria and since major emotions, such as rage and fright, are attended by nervous discharges along splanchnic pathways, glycosuria, as an accompaniment of emotional excitement, might be expected to occur.")

Another piece of work done at Harvard three years ago, by



Dr. Folin and others, is worth mentioning. They say "if there is such a thing as emotional glycosuria in human beings, we would naturally expect to meet with it very frequently in the insane." Two series of insane patients in two hospitals were tested for glycosuria. In one series of 192 patients, 12% showed sugar; in the other series of 664 patients, 8.7% showed sugar. A similar test was made of two series of students before and after an examination. Of 34 second year medical students one had sugar before and after the examination; "of the remaining 33, six, or 18%, had small but unmistakable traces of sugar in the urine passed immediately after the examination." Of 36 second year women students of Simmons College, six, or 17%, showed glycosuria immediately after an examination, the test having been negative in every instance the day before.

Another etiological factor of great importance and the presence of which in an individual is easily recognized, be he patient or applicant for life insurance, is overweight. Joslin says, "the most common etiological factor which my statistics show is obesity." He gives a table of height and weight of 399 of his cases arranged in age groups; 298 of the 399 cases were over 40 years of age. Taking these in thirteen groups, that is those from 5 feet no inches to 6 feet no inches inclusive, there are from 12 to 41 individuals in each group and the average of every group compared with Shepard's Table shows overweight varying from 28 to 59 pounds or from 16% to 34%.

It would be bromidic to remark that both overweight and glycosuria are considered impairments and the man who shows two impairments should be scrutinized more carefully than if he had only one.

Dr. Patton said, "formerly the reduction of Fehling's Solution on boiling with urine was considered a positive sign of diabetes mellitus, but many such persons outlived expectations and later showed no sugar in their urine." It has been said that it is safer for both physician and patient to consider everyone who shows glycosuria a diabetic until it can be



proved that he is not. How is this to be proved? We must, as Dr. Patton has said, protect the interests of our companies and how shall we be sure we do not deal unjustly with the applicant? It is the duty of the Medical Department to separate the sheep from the goats, to accept the good and decline the bad in this as in every other doubtful group. It would be a too easy solution to say decline all applicants who show glycosuria and surely such a method would be an injustice to many. It seems to be the general impression that more cases of glycosuria are coming up for consideration year by year. Joslin states his belief that by conservative estimate, 1% of the entire population of the United States to-day have diabetes or may develop it. The question of safe selection, therefore, is likely to continue a vital question as long as any of us are members of this Association.

The different companies have been following different methods of selection and this seems to be a fitting time to report results, to explain what methods have been followed and how they have stood the test of time. Dr. Ogden told us last year what the Metropolitan has done. It will be of interest to know what additional data they have accumulated in the past twelve months.

In the New England Mutual we have felt somewhat as if we were groping in the dark in this matter and as I have shown in my report of the results of our special urinalyses, we have taken comparatively few who had shown glycosuria and those few were those who were otherwise exceptionally good. We have required a signed statement from the applicant that he has never been under treatment or on a diet for sugar in the urine and is at the time on a full diet including starches and sugars. We have felt that in the absence of more definite data to guide us, it is better to be overcautious. I have wondered sometimes if it would not be feasible and worth while to have the applicant's family physician, if he has one, send us a statement covering his knowledge of his patient's history so far as it had any bearing on the question of glycosuria. In most of the cases which we have accepted, we have reason to

believe that the presence of sugar was first discovered in the routine examination for insurance.

The results of the study of our ten years have encouraged us and we hope that the result of the discussion to-day will give us additional courage and that we shall be able to be a *little* more liberal in our attitude towards applicants who have or who have had glycosuria.

Dr. Wells—I am sure we appreciate the discussion on the part of Dr. Martin and Dr. Blakely on this particular subject. Has Dr. Ogden anything to say?

Dr. Ogden—I have nothing to add. Dr. Blakely referred to our figures in the Metropolitan for the last twelve months. We have them, but I have forgotten exactly what our percentage is in these sugar cases, except that it is lower than it was last year. It is nearer the average than it was then as I recall it, but not much nearer. That is all.

Dr. Frank Wells—Mr. President, reference has been made to underlying causes in the production of glycosuria. I can best explain my meaning by relating a case that came under my observation a number of years ago. This was a general agent of one of our large insurance companies who consulted me in regard to his condition. He was a large man with quite a prominent abdomen—just how much he weighed I do not know. I analyzed a number of specimens of his urine, in none of which the specific gravity was over 1022, yet in every one of them there were marked evidences of glycosuria. I told him it was absolutely necessary for him to consult his family physician which, strangely enough, he agreed to do. The man was a professor in one of the neighboring suburbs of Boston, a very intelligent man, and a man of great common sense. This gentleman lived in a malarious district, and his physician put him on large doses of quinine, and after the lapse of from one to two months, the sugar entirely disappeared from his urine, and in a number of analyses made afterwards I never could discover a single trace of it. He died some ten years afterwards from an extraneous disease—nothing to do with his glycosuria.

Dr. Daley—We have all been very much interested indeed in Dr. Patton's paper, and we have heard the experiences of some of the companies on cases that have had sugar. We have not, however, had any outline of the number of analyses or the manner in which these cases were examined at the time of their acceptance. A number of years ago it was the practice of the Equitable to give them the sugar test of 100 grams of glucose. Unfortunately two or three of them got sick, and one of them threatened to sue the Company, and we got cold feet. About that time we found also that a number of healthy men in the office would show sugar after such a horrible dose, so we discouraged that test, but we did adopt a three-test system, that is, we tried to obtain three succeeding specimens, preferably six days apart or longer, after full time for digestion. Even if we found sugar in the first specimen, or in those cases with an M. I. B. record of sugar, we required three specimens. That has been our practice, and still is, of selecting risks with a history of sugar. Some few years ago, we had an analysis of that group. I have not the figures here, but if I remember rightly, it was equal to the Equitable's experience, and I think there were over one hundred cases in the group, so it was enough to show which way the wind blew.

Dr. Ogden—I have had an experience within the last twenty-four hours that I think shows how very careful we ought to be in these sugar cases. This was a physician who applied for insurance, with a first class history, good physical examination in every way, but an M. I. B. record of sugar, the time I don't remember, but within five years, I think, and within a year the report of glycosuria had been q'd, in other words, the applicant had probably been taken for insurance, at any rate sugar was not found then. We asked for a specimen of urine because of the history. The urine was satisfactory, and a second specimen was satisfactory, and I was on the verge of recommending him, but his occupation being a physician and with the history of sugar, the question arose whether there was anything out of the way about the case, and my associate, Dr. Holden, said: "I think we had better have

another sample." I agreed with him, and we had another specimen which contained sugar—I suppose 3% or 4%, showing how very carefully we have to consider these cases. Now one of two things happened, and we are going to try to find out what that was,—either the doctor was on a restricted diet, as I suspect he was, and got tired of the diet, or else the examiner did not procure authentic specimens when he thought he was getting them or intended to get them. About the last specimen he said that there was no question as to the authenticity. We are going to find out more about the other specimens, but that is merely one example of an important class of cases that we all get caught with, and those are the cases that raise our figures.

Dr. Pauli—I merely wish to bring out one question, and that is, the relation of glycosuria to hypertension. We had an interesting experience when these hypertension cases were being side-tracked to the Union Central. We rather expected to find albumin and casts present, but to our great surprise there was an unusually large number that had sugar in the urine. I believe Dr. Fisher's statistics show also that there is a large percentage of them that die of diabetes. Now the relation of that was explained in an editorial in the *American Medical Association Journal*. In hypertension cases we have an excess of the internal secretion of the adrenal glands. It was later discovered that the mobilization of the glycogen from the liver and muscles depended upon the internal secretion of the adrenal and pituitary bodies, and when there is an excess of this secretion, there is an excess of the mobilization of the glycogen, causing a hyperglycæmia, with the result that there is sugar present in the urine.

Dr. Patton (closing the discussion)—I want to thank you gentlemen who have discussed the paper. You did not bring out some points I was in hopes you might bring out, in the way of instructions or directions to give our examiners in the handling of cases in which we get a reaction for sugar in the specimens of urine examined in the field or in the ones they send to the Home Office.

Dr. Martin said that the cause was important. It is the essential factor, as to whether or no we can consider the case as an insurable one, even on some substandard basis. The figures given by Dr. Joslin, the table on the board by Dr. Martin, is to some extent a little misleading, unless we take it in connection with the other figures. Remember I stated that the average age of those who had died was about  $5\frac{1}{2}$  years (about 50% of his cases had died); and the average duration of those living was about  $6\frac{1}{4}$  years, so that we have that to consider in Dr. Joslin's figures, which are the best, so far as I know, of any clinical man's figures on the possible duration of life of the diabetic.

Dr. Martin mentioned heredity in probably one third of the cases. We all realize that it is a rather important factor in connection with life insurance work.

The question of a cured case,—we have had for many years the question of whether a tubercular case is a cured case. Most of us consider that a tubercular case can become an arrested case. Very few of us from a life insurance standpoint consider that it becomes a cured case. A true diabetic becomes an arrested case, but I must confess I agree with Dr. Joslin, I do not think it is a cured case. Let down the bars on diet and on your restricted care, and your diabetes will resume its presence.

Dr. Blakely's reference to the scientific portion of the discussion,—none of us who are active in life insurance work have time to follow closely the scientific side. We can read, as I do, some of the scientific part of the question, and the question is, how can we apply that in drawing conclusions and applying them to our work? That is the prime point in my consideration of the subject. It takes time to prove whether we have a temporary glycosuric or a true diabetic under consideration. Strongly I would say that in my opinion the data presented by Dr. Blakely shows that those cases were not true diabetic cases. They were for some reason temporary glycosurics. His mortality percentages which may be changed by further experience materially are

such that that would be my conclusion from that list of cases. They were not true diabetic cases.

The process of the method followed, that Dr. Daley mentions, of specimens at six-day intervals, undoubtedly would have caught that case that Dr. Ogden speaks of. The third specimen he got showed sugar. The man got tired of his diet or of his restriction or whatever it was that prevented the appearance of sugar. That is perhaps as easily applied a method as we can at present use in our life insurance work. I have prepared a little statement here as to some of the general phases of the case in an attempt to catch these diabetic cases.

#### DISCUSSION

Dr. Patton—Diabetes should be suspected in all applicants whose urine shows a positive or suspicious reaction for glucose; those giving a history of objective or subjective symptoms of the disease; and those with a previous sugar insurance record.

Concerning the diet, we should ascertain whether the applicant has ever followed any special diet either upon the advice of a physician or layman, or of his own volition; whether he has ever fasted for twelve hours or longer because he felt that he would be the better for it; how many meals he eats daily; whether anything is eaten between meals; what time in the day the principal meal is taken, the types and amounts of solids and liquids consumed, and whether any sugar substitute such as saccharine has ever been used.

Careful inquiry should be made about the hepatic, pancreatic, and gastrointestinal history of the applicant, as well as for any symptoms of nervous or neurotic trouble, or abnormal effects of the adrenal or pituitary glands upon metabolism.

Recognizing the spreading fame and the effect of the Allen starvation treatment, that must receive particular attention in our investigations of dietary or other methods of treatment. We know that thorough treatment begun in the early years of diabetes and conscientiously continued, will usually maintain



a sugar-free condition; but if this is obtained and retained at the expense of nutrition, there is a lack of resistance and the treatment injures the case.

The presence of acetone and other acidosis products in the urine demands careful consideration and their significance should, if possible, be checked by examination of the blood and expired air.

The best time to obtain urine specimens in glycosuria cases is one to two hours after the principal meal, and if this sample proves negative, then examine an evening and a morning specimen.

The assimilation test-meal may be used, as sugar elimination is pathological with 150 to 200 grams of glucose, or, following Dr. Eckstein's suggestion, the applicant, in the presence of the examiner, may eat a piece of cake and a half-pound of sweet chocolate, and the urine specimen then obtained in one to two hours. The tests for glucose must be properly applied to obtain dependable results and this is often difficult to have done in the field. The use of Fehling's, Haines', or Benedict's copper solutions, Nylander's reagent or the phenylhydrazin test should be sufficient, and the fermentation test or the polariscope are valuable in doubtful cases. We must remember that lactose, maltose, pentose, and glycuronic acid also reduce copper and bismuth solutions and eliminate them. Indicanuria may be frequently noted and it is of importance in estimating the gastrointestinal elements of the case. Diacetic acid is satisfactorily determined by Gerhardt's method and the antipyretic drugs that may be present can be eliminated by boiling, which causes the rapid disappearance of the diacetic acid Bordeaux-red color. Distillation of the urine makes more delicate the Gerhardt's test, also the Legal's test for acetone.

Folin's method is the best for total nitrogen and ammonia. The ammonia is the measure of the body's reaction to counteract the acidosis, while total nitrogen shows the amount of acids excreted, being an index of the total proteins disintegrated.



Blood-sugar determinations are valuable in clinical work, but their feasibility has yet to be determined in life insurance cases.

The Benedict method (based upon the fact that picric acid and glucose in the presence of an alkali on heating give a color reaction proportionate to the amount of glucose present) is standard, but requires 2 c. c. blood as a minimum. The Kowarsky and Epstein test, which can be made with a few drops of blood, is much more readily applicable in insurance work. They use the Sahli-Gower hemoglobin colorimeter and the test can be completed in seven to ten minutes.

The carbon dioxide in the blood plasma is easily determined but the test requires too much blood. The hydrogen-ion concentration of the blood can be determined with 1 to 3 c. c. of blood but its value has not yet been thoroughly demonstrated.

The alveolar air carbon dioxide determination is of great importance in the treatment and prognosis of diabetes, as it furnishes a ready means of estimating the severity of the acidosis. The alveolar air carbon dioxide changes inversely as the amounts of the unusual acids in the blood. Being a measure of acidosis, it is of no value unless the urine shows acetone by the chemical tests. Normally, the carbon dioxide value is 5 to 6% and cases with 2% may show coma in twenty-four hours, while those with 3 to 4% may go for two or three days. Sudden drop in alveolar air carbon dioxide is unfavorable and alarming.

Alveolar air carbon dioxide measures the acidosis of the blood at the time of observation, whereas increased excretion of substances in the urine may mean that alone and not an increased production, as production and urinary excretion do not necessarily run parallel.

Acetonuria without glycosuria is not sufficient to diagnose acidosis as shown by many cases of acid intestinal fermentation.

Riegler's test: using 1% methylene blue and 2 drachms urine, the mixture will become decolorized with 4 drops tincture iodine if there is acetone in the urine, while if diacetic acid is present 20, 30, or 40 drops of the tincture may be necessary, the excess over 4 drops being due to the diacetic acid.

Admitting that these tests at present are beyond our application in the ordinary or average insurance case, it does appear to me that they are coming much nearer our ability to use them, and that we can determine whether or not we have a true diabetic more readily than we have been able to do in the past.

Dr. Wells—I desire to extend the thanks of the Association to Dr. Patton and to Dr. Blakely for presenting these two papers on the urine. I know to what extent they have labored and worked, and the time they have put upon it, and we certainly are deeply indebted to them, for this very interesting presentation, very able and very helpful. Our next order of business is the consideration of a report presented to the Association by the committee appointed last year to study the subject of urinary nomenclature. This committee, as you heard, presented their report yesterday. It was appointed with a view to determining more clearly and if possible obtaining a coördination of ideas and of action in urinary examinations. The committee comprised the following members: Dr. Daley, Chairman, Dr. Ogden, Dr. Dwight, Dr. Hobbs, and Dr. Patton. You have heard the report and it is now open for discussion by the Association. I will ask Dr. Symonds to open this discussion.

#### DISCUSSION OF REPORT OF COMMITTEE ON URINARY NOMENCLATURE

Dr. Symonds—Mr. President and Gentlemen. In going over your report when it was first presented, it seemed to me that the committee had done a lot of very excellent work, but that some of their findings rather leaned towards what might be called liberality, and that it was quite easy in some of the cases to indicate findings in a way that would simplify matters.

Take the specific gravity. It is recommended that the word "normal," as relating to the specific gravity of the urine, shall refer to urine whose weight is between the limits of 1015 and 1025 inclusive, etc. Why not have the specific gravity

distinctly set forth? Anybody can then make up his own mind as to whether it is normal. "The term, 'high specific gravity,' shall refer to urines with specific gravity persistently over 1030." Why not give exactly the specific gravity? "A urine with a specific gravity of 1012 may be described as somewhat lower than the normal." Why not simply put down what the specific gravity is, instead of "somewhat lower than normal"?

"Albumin, very faint trace." I think those albumin reactions are about as well as can be described without the use of an albuminometer, and I have some doubts as to the real value of an albuminometer. Esbach's is the only one of real value, and that is not ideal. It is impossible to measure albumin in percentages, and therefore these terms for albumin are as good as can be.

But when you come to sugar, what is the use of saying, very faint trace, or trace, or anything? Why not say the definite amount? The Association can decide whether that amount shall be grains per ounce, or percentage, whichever it thinks fit, but there is no reason why it should not be put down definitely. As I understand it, these reports are to go out to the M. I. B., and it would not be at all difficult to report three or four specimens, one after another, with the exact amount, either grains per ounce, or the percentage. Then you get rid entirely of this question as to faint trace, large trace, etc.

With reference to the microscopical examination—what is the size of the slide? What is the size of the cover-glass to be used? That is of fundamental importance. The committee say: "The sediment of about 15 cc. of urine centrifuged for 3-5 minutes at a rate of 1500-2000 revolutions per minute, or about 30 cc. sedimented by gravity at least twelve hours, shall be considered satisfactory." That is all right. Now they go on: "The following terms shall convey the number present in one slide." Well, an ordinary slide is about three inches long and one half to three quarter inch wide. Do they mean that or a cover-glass, and if so, what size cover-glass? Furthermore, in one slide—"rare." Why not put down exactly the number of casts. If we want

to differentiate especially on matters of that kind, fix beforehand definitely what the size of the slide or the cover-glass is that we are to use, and then let us report the exact number of casts. That can be easily put in. I do not see any objection to that. The nomenclature that is used in the matter of casts can be so easily resolved into a numerical one that it seems to be a mistake to put down, "rare," "occasional," "few," when you can put down exactly the frequency provided you know the size of the cover-glass that is used. The same remarks would apply to blood-cells, crystals, etc.

Dr. Bennett—I did not hear the report yesterday. I was not here, and possibly my suggestion may not hit the mark. I take it that we are endeavoring to get at some way of expressing the content of the urine in brief terms that shall be uniform. In discussing this matter with our pathologist, he suggested a little scheme by which he had arranged an arbitrary scale in which a normal urine should have 100%, and he made out this little table for me, which, if it is not taking too much time, I will read by way of suggestion:

He assumes that a normal urine will have 100 points to its credit, and then he takes up the various points. They are not here in the order of their merit or importance.

Taking the reaction, assuming that an acid reaction would be normal, he credits the urine with one point; if alkaline, with only one half of one point. A specific gravity normal at 1020, he would credit a 1020 urine with ten points. If the gravity ran down to 1010, he would credit it with only five points; at 1002, with only one point; at 1040, no credit at all, or a zero credit.

The color is rather unimportant, and he credits clear amber as only one half of one point.

Now coming to albumin, it has been our habit to make two tests for albumin—one the cold nitric acid test, and the other the salt, acetic acid and heat test. If the cold nitric acid test was negative, he would credit the urine with  $12\frac{1}{2}$  points. If the acetic salt test showed negative, he would credit the urine with another  $12\frac{1}{2}$  points. If both tests

showed it, of course there would be no credit at all. He separates, for instance, "faint trace" by the cold nitric acid test, and "faint trace" of albumin by that test would get a credit of only nine points, instead of  $12\frac{1}{2}$ . "A small amount" would be given five points. A large amount, of course, would be zero. The same with the acetic acid test—faint, small, large, 9, 5, and 0.

Then taking the sugar test, the negative would give the urine ten points to the good; a faint reaction, five points; one per cent. or over present, only one point. Fermentation test would give 0 credit.

Taking the urea, 2% as normal. Finding that, he would credit the urine with five points;  $1\frac{1}{2}$ %, four points; 1%, three points, and smaller accordingly. Bile absent, one point to the good. Indican absent, one point. Casts absent, 25 points to the good. These he separates in the usual way—large hyaline present, 24 points bad; large granular, 20; small hyaline, 15, etc. Crystals normal, 5 points to the good; phosphates present, 2 points; pus absent,  $8\frac{1}{2}$  points good.

Then using 15 cc., a few leucocytes receives seven points, blood absent, six points, and so on down proportionately, making altogether 100 points to the good. Of course the important points are albumin, sugar, and casts.

Now this has not been worked out in our office at all. It is only what you might call a preliminary sketch, and we have not decided on it, but it came up and it seemed to me a little opportune in this discussion, and I thought it might be well to submit it for consideration.

Dr. Wells—The question is, gentlemen, what disposition is to be made of this report which has been submitted to you for consideration.

Dr. Symonds—Mr. President, I move that it be referred back to the committee with instructions to report a numerical rating wherever possible.

Motion was seconded by Dr. Porter.

Dr. Dwight—As the one member of the committee who did

not do his duty, I think I should say a word. I did not attend any of the meetings. I did have the privilege of following, through correspondence, their thoughts as they went along. I confess that in the beginning I was rather sceptical, but finally I approved it, reserving the right to differ on the floor. After thinking it all over, I have decided that, taking it as a whole, they did a very good piece of work.

It is easy enough to criticize. I think it would be absolutely impossible to get up any such report that could not be criticized, and very properly criticized.

As I understand it, the purpose of this work is to develop a measuring rod which would give us a more definite idea than merely the statement, albumin, casts, or sugar. I am disposed to agree with what Dr. Symonds said, but I do not like his idea of making a numerical code for the number of casts. It seems to me the question as to whether there are one or three is not very essential, although some of us may differ. It seems to me that it simplifies matters if we have a form of words which means rare casts—one to five,—instead of saying one, two, or three.

As the only member of the committee who was absent and who appreciates the difficulties of the work, I hesitate a little to vote, without serious thought, that the report be referred back to the committee with definite instructions to report a numerical code, and without giving them an opportunity to express their reasons for the code which they have adopted. I should like to have some one of the committee who took an active part express his opinion and the feelings of the committee.

Dr. Wells—There is a motion before the house. The question you are debating now is whether this report shall be referred back to the committee with instructions for them to prepare a numerical rating, or code, wherever possible. That is the question for discussion. The committee have an opportunity certainly to be heard.

Dr. Daley—When we first started in to discuss this subject, we were pretty far apart, and it took quite a lot of give and



take on the part of all of us to get together. Dr. Symonds's remarks are very pertinent when they refer to one specimen, but when you refer to a class of cases—that is, a class of cases with urine slightly lower than normal, showing an occasional hyaline cast, a few red blood cells, it is those classes we are going to talk about. We are not referring to any individual examination of urine. Of course it would be ideal to have all of these expressions put in numerical form, if it could be done, and for that reason the titration test was mentioned to give a definite idea of those terms,—this gives numerical terms for sugar.

There is possibly one weak point in the paper, and that is the slide. What the committee had in mind, if I interpret them right, is that the sediment thus obtained showed that much. As a rule, all the sediment is on one slide. It is immaterial what the slide is. We usually take a slide and take all the sediment of that one centrifuge or that one sedimentation, and spread it on the slide, and that gives a definite idea that you find so many red blood-cells, so many leucocytes, so many casts, in 15 cc. of the urine centrifuged or sedimented. And possibly the report might be amended to say: "The sediment of 15 cc. of urine when spread on the slide." We had quite a discussion as to microscope fields, and we decided to sidestep that because of the difference in magnifying power of different microscopes, and we walked all the way around that, and got on the slide to keep from further discussion, because we could see the trouble it was going to bring up, but the main idea was that the sediment thus obtained from 15 ccs. when spread on a slide should show that number to express those terms. These terms have been used in these meetings so much, they mean one thing to one and another thing to another. Now they meant a good deal differently to us when we first started talking about it, and it took considerable discussion and consideration to get together when we were so far apart. But this description now means something definite. I would be greatly in favor, for instance, when sugar was reported, if the percentage of sugar was shown in the



M. I. B. report. It would be an excellent thing, but this terminology is more to be used in discussing classes and groups of cases.

Dr. Porter—I am reluctant to criticize such an admirable report as these gentlemen have made, showing study and thought; but in the present day we are developing more and more action by committees and are coming in contact with laymen, in the consideration of causes determining the acceptance and non-acceptance of risks. When we apply the term "few" to 7 to 10 casts on a seven-eighths inch square slide, it conveys a wrong idea, according to the acceptance by the average layman of the term "few." When we say "a few," it implies that there are a few of comparatively small significance, to the lay mind at least. To those of us who are doing accurate laboratory work, it is immaterial whether we report our findings by number or by words to express that number, but in committee action I believe you would find that the adoption of these terms would lead you to considerable embarrassment. In seconding this motion, I question the advisability of conveying in our interchange an idea of the specific number of casts, red blood cells, or pus cells found.

Dr. Ogden—As a member of the committee, I want to say a few words, and also to ask for instructions. In the first place, as Dr. Daley says, we were some ways apart, particularly in the matter of sugar. There were some of the companies who quantitated the sugar and there were some who did not. I presume the majority of those in the Association do not make quantitative determinations of every case of glycosuria, or the amount of sugar that is present in any given sediment. Therefore it seemed to us only fair that we should meet all of the conditions—those who want the quantity get the quantity. We have given the approximate percentage. A moderate quantity is approximate to 1%.

Dr. Symonds—Should we not educate the other companies?

Dr. Ogden—We had no intention of dictating or of trying to educate the other companies. It was to meet the emer-

gencies of the Association as a body, to let those who wanted to quantitate do so, and those who did not want to quantitate, not to do so, but to have terms to express those varying quantities of sugar.

Now with regard to casts, we have given figures and we have given the numbers, and we have also given terms which correspond: rare, one to two; occasional, three to six; few, seven to ten. There is no objection to using the number, but we thought also there would be no objection to using the terms, one being equal to the other.

Dr. Van Wagenen—There is one thing that perhaps is an error. I notice that there is no difference in this nomenclature as expressing the variety of casts. Now I am aware that certain gentlemen who follow Professor Fisher's views, perhaps, claim that it does not really make any difference, that you can change one variety of casts into another, but we have always felt that there was considerable difference in the character of the cast; in other words, that a granular cast means a great deal more than a simple hyaline cast, and I would like to ask whether that matter was considered at all, or even the size of the hyaline cast, whether it is a large hyaline. We have been inclined in our company to overlook a very small number of large hyaline casts, whereas if they are smaller, we look at them a little more seriously, and granular casts still more seriously.

Dr. Wells—The question Dr. Van Wagenen raises is whether the number of casts here qualified with the word "rare," could be modified by giving the kind of casts.

Dr. Toulmin—There seems to be a difference of opinion as to just what use these terms are to be put. Dr. Daley expressed the idea that they were to be used before this Association in the discussion of papers. Dr. Symonds, I judge, is criticizing the report wholly on the basis of individual applicants. I was not present last year, so I do not know for just what purpose this nomenclature was intended. I for one should like to know whether the committee was working towards the end as expressed by Dr. Daley, or was it also

hoping to combine in that a report from one company to another.

Dr. Daley—There was no reference to the M. I. B.

Dr. Wells—The report was not intended for use in the M. I. B. but merely for use on the floor of this gathering.

Dr. Patton—As a member of the committee I agree with what has been said by the others. We did not by any manner of means have a unanimous vote of all the members of the committee on any one phase of the proposition. We discussed whether we should recommend the report to the M. I. B., and decided that it was none of our business. We cannot report to the M. I. B. under casts whether it is a hyaline cast or how many casts there are. We can make a report of casts being present, and if any company wants to ascertain the number and character of the casts found, they can correspond further through the Bureau. I think that should take care of that phase of the discussion. The question raised by Dr. Porter as to discussing with our Executive Officers the meaning of the word "rare" or "few"—what is the difference? We have to explain to them anyway the significance of the meaning, and they will take our explanation of the word "rare," just the same as "ten" or "seven" casts. We have given our opinion as to whether or not the number of casts found in that specimen of urine has any particular significance from our standpoint as to the acceptability of the risk. To my mind, it does not make any difference whether we say "rare" or "ten" or "twenty," or whatever the number may be. The idea is to try to get in papers placed before this Association a uniform set of terms to use, if possible.

Dr. McCullough—Just one thought occurred to me, and that is that in describing these various conditions numerically, the committee has employed words of such common everyday use that, unless you are on the *qui vive* all the time, you will really misunderstand them and your auditor will misunderstand you.

Dr. Symonds—One practical objection in regard to these terms—"rare" casts, one to two, "occasional," three to six,—

in a good many offices when the microscopist finds five good typical casts, he would be apt to stop there. I do not think he would be apt to keep on hunting indefinitely after that. If he found five casts he would be likely to stop. Then that would go on the report as "occasional," where it might really have been a good many. I think that is one distinct objection to the use of these terms.

So far as sugar is concerned, I do not see any reason at all why it should not be reported here to the Association, if they want to so report, that three specimens of urine showed  $\frac{1}{2}$  to 1% of sugar. I do not see why it should not be reported in just those terms, instead of "very small" or "small." There is no reason why it should not be stated right out and definitely, and if companies are not quantitating their sugar, they ought to be doing so. They ought to make a quantitative analysis for sugar cases, and give us the results. They should not confine themselves to saying "large" or "small," "little" or "big." They should give something more than that. The problem of albumin is insoluble, except perhaps as it has been indicated, because in very bad cases there may be only the faintest possible trace, but in sugar it has a very distinct bearing, and I should think it would be perfectly easy to report it by those terms. Now of course the fact that it is not for use in the M. I. B. does modify to some degree the force of my criticism. That is to say, it is not so serious a matter as I thought it was when the report was presented, but I think still it can be made to work comprehensively by a numerical system which I think the committee can devise with a little more getting together.

Dr. Porter—I should like to offer an amendment to the motion, that this report be referred to the committee with instructions to bring in a report at the next meeting modified as they may deem best upon the discussion of the question as it has arisen here. We have certainly gotten much more definitely the idea of some of the members of the Association as to what is their desire.

Dr. Daley—There is nothing in this report to prevent any

one from making a numerical report. A numerical report is highly to be desired. It is accurate. There is nothing to prevent Dr. Symonds reading a paper or presenting a paper stating that in thirty-four cases of sugar there was an average of 3 to 4%. The committee's report does not require that you use these terms, but the report simply means that these terms mean so much sugar.

Dr. Symonds—But a committee like this gives to their terms weight and substantial weight.

Dr. Daley—I still do not see it but if it is your pleasure it is easy enough to change that around.

Dr. Symonds—I am willing to accept the amendment to the motion.

The motion was carried as amended.

Dr. Wells—The committee will remain in force and act accordingly.

Dr. Wells—Some time ago, I attended a meeting in which a native African spoke. He was from Zanzibar. He had had a very wonderful experience, and was telling us something of the customs of that country. Among other things he went on to tell us how they selected a wife over there in the wilds of Africa. He says that for a first-class wife, the price was forty cows; one not so good was twenty cows, and graded down. A woman with one child you could get for ten cows, and if she had five children you could get her for five cows, but if she had ten children you could buy her for a billy goat. That is the way they select women in Africa, and while we do not do that in this country in just that way, our next speaker will tell us just exactly how we do select them. I have the pleasure of calling upon Dr. Rockwell for his paper.

Dr. Rockwell—Mr. Chairman, I had no idea when I some time ago determined to present to you a paper on something or other, that I was getting in quite such deep water as was described by our President of yesterday, and by our President of to-day. As a matter of fact, I prepared a little data from

one source and another, and hurriedly put them together, and told the stenographer to prepare it, and she did and finally brought it back and said: "What are you going to call this study?" I did not know, I had not thought of the title, and I told her to fix it up to suit, and she did, with the result that she put me down as endeavoring to impart to you some hidden knowledge on my part of the selection of the female sex. I hope it does not go so far back as Judge Day said, to the time of Eve, however.

### THE SELECTION OF WOMEN

BY THOMAS H. ROCKWELL, M.D.

*Medical Director, Equitable Life Assurance Society*

In these days of commercial and professional women and of those who by education and environment have many duties and responsibilities in common with men and who in the pursuit of happiness or the almighty dollar enter into keen rivalry with them, and whether such a being as an emancipated woman really exists or is only the product of one's imagination, the fact remains, we are not surprised that they are realizing more and more the benefit and necessity for life insurance and that proposals for policies on their lives form a considerable part of the business of most companies; nearly all of which issue insurance to them on one plan or another.

It is interesting to note a table based on English population from 1910 to 1912, statistics published by the Registrar-General in England and Wales in 1914. (Supplement to the 57th Annual Report, Part 1, Life Tables.) According to this publication the complete expectation of life of unmarried women, married women, and widows, was as follows:



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Ages	Unmarried	Married	Widows
25	43.55	43.27	40.45
30	39.25	39.08	36.48
35	35.05	34.91	32.55
40	30.92	30.88	28.70
45	26.92	26.93	24.96
50	23.12	23.08	21.44
55	19.48	19.41	18.07
60	16.04	15.99	14.90
65	12.86	12.82	11.96
70	10.01	9.99	9.30
75	7.55	7.57	7.15
80	5.58	5.61	5.43
85	4.16	4.16	4.16
90	3.13	3.14	3.13
95	2.38	2.39	2.36
100	1.69	1.72	1.58
105	0.94	0.97	0.83
107	0.72	0.75	....

There is only a very slight difference in the expectation of life of unmarried and married women, but, up to age 85 the widows are considerably shorter lived than unmarried and married women. From this table, derived from the general population, it would seem that women, whether single, married, or widowed, should give about the same rate of mortality to insurance companies. We all know this is not the case, for the Medico-Actuarial Investigation, with data from 1885 to 1908, has proven a remarkable difference between insured single, married, and widows, as the following table shows:

	Single Women	Married Women	Widowed & Divorced
Ordinary Life	107%	130.1%	114%
Lim. Payment	80%	115.9%	94%
Endowment	76%	104.7%	99%
Total	81%	119.0%	105%

Arranged according to age groups the experience is as follows:



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Ages:	Single Women		Married Women		Widowed & Divorced	
	1-10	1-24	1-10	1-24	1-10	1-24
to 29	90.1%	91%	150.8%	148%	137.7%	141%
30-39	73.9%	73%	128.9%	126%	110.6%	109%
40-49	69.2%	70%	106.5%	104.5%	105.5%	104%
50-59	67.5%	69%	99.1%	100.5%	105.0%	104%
60-			79.6%	85.8%	87.1%	92%
	80.7%	81%	121.1%	118.7%	105.3%	105%

Arranged according to policy years:

Years	Single Women	Married Women	Widowed & Divorced
1	82%	140%	
2	72%	138%	
3- 5	84%	122%	
6-10	81%	107%	
Total	81%	119%	105%

In order to get the latest data obtainable to me, I had the experience of The Equitable compiled from 1906 to 1915 and have obtained the following results:

	Single Women	Married Women	Widowed & Divorced
Ordinary Life	83.6%	113.6%	103.5%
Lim. Payment	56.6%	94.1%	83.5%
Endowment	56.6%	85.3%	91.9%
Total	59.0%	99.1%	96.8%

Arranged according to age groups the experience is as follows:

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Ages:	Single Women	Married Women	Widowed & Divorced
to 29	62.7%	109.4%	
30-39	47.6%	96.0%	
40-49	64.4%	90.4%	
50-59	....	102.5%	
60-	....	95.0%	
	59.2%	99.1%	96.8%

Arranged according to policy years:

Years	Single Women	Married Women	Widowed & Divorced
1		83.8%	
2	62.0%	114.2%	
3-5	63.9%	98.2%	
6-10	81.0%	99.6%	
Total	59.2%	99.1%	96.8%.

The comparison of these figures of the Medico-Actuarial experience from 1885 to 1909 with the Equitable experience from 1906 to 1915, show indeed a general remarkable improvement in the selection but still the mortality of the married women remains much higher than the mortality of the others.

To be profitable their lives must be carefully selected, and, in my own Company, we have had conclusive proof that this is not only possible but comparatively easy. We all recognize that the greatest danger lies in selection against the company and that safeguards must be instituted to reduce this to a minimum.

In former years, before women were actively canvassed, when women agents were almost unknown, when the great bulk of applications were presented with little or no soliciting, it was only natural that the woman who was fearful of her chances for living should apply in the hope of receiving a policy. Companies having a Women's Department, the agents of which work as assiduously among their own sex as do the men

among theirs, are likely to overcome this adverse self-selection to a very considerable degree, for it is only by hard and persistent work that the agent is able to induce a woman who believes herself to be perfectly well to insure her life. Hence, I believe that companies who insure women at all should encourage their active solicitation on nearly as possible the same lines as on men. However, this in itself will not overcome all of the objections.

If we agree with Robert Burns that, "A man's a man, for a' that," we must also allow, "A woman's a woman for a' that."

It may have been ever so hard for the agent to have induced her to apply for the policy, but once her mind is made up to take it, she *wants* it and by her answers very likely to place herself in the most favorable light possible. Perhaps, being naturally more subject to aches and pains than is a man and believing them largely due to the fact that she is a woman, she is very prone to minimize them and, unless the Examiner adroitly shapes his questions, a wrong pen picture is likely to be recorded. It is very necessary that the Examiner be patient and solicitous to obtain a correct history without giving offense, especially as it is well recognized that it is impossible to conduct the physical examination with as great care and detail as when examining a man.

It is well to have a list of supplementary questions to the application to determine more carefully the insurable interest, why the insurance is desired and by whom the premium will be paid. If she is married, whether her husband is insured for at least an equal amount and, if a widow, whether she is dependent upon her children or the reverse.

While I offer you no statistics on Joint Life Mortality—man and woman—I refer you to Vol. V, page 29, of the Medico-Actuarial Mortality Investigation, which clearly indicates that closest scrutiny should be given all such applications and that a severe selection should be made, even if accepted at all.

Careful and thorough inspection reports should be had in every case, for a woman's ills are often well known in her own neighborhood, and the local inspector sometimes obtains

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valuable information which does not appear on the medical report.

It is desirable to ascertain your own company's experience among women in the different localities in which you are writing them. It may be that in some sections your results are not as they should be and by taking remedial measures you may be able to cause improvement. This has been done by my own company with the result that a very decided improvement has been made in certain localities, placing the mortality in these places very much on a level with the most favorable.

Guided by population statistics and by mortality experience on annuitants, which almost invariably showed a lower death rate for women than for men, it was the rule up to 1843 for life insurance companies to charge to women applicants the same rates as to men. But, in 1843, when the so-called 17 Office Experience, the first large mortality experience on insured lives, was published, it was found that the insured women were subject to a mortality much higher than the mortality of insured men, and, from then on, the life companies used great care and applied higher rates in insuring women. The greater care showed its effects in eliminating much speculative insurance on the lives of women and gradually their mortality improved.

It may be interesting to show the mortality of insured women, expressed in per cent. of the mortality of insured men, as found by the Institute of Actuaries, for the periods before 1863, from 1863 to 1893, and also the mortality of insured women based on our own M.-A. Table.

Age	Before 1863	1863-1893	Age	M.-A. 1885-1909
20	108.7%	131.7%	15-29	114%
25	163.0%	145.7%	30-39	104%
30	153.5%	151.3%	40-49	98%
35	134.1%	121.0%	50-59	100%
40	121.7%	121.1%	60	89%
45	111.7%	97.0%		
50	90.6%	91.1%		

Thus, it will be seen that, compared with men, they have shown a great improvement, which is still more remarkable when we consider that men too have improved greatly; accumulated evidence seems to indicate conclusively that the mortality of insured women has been improving more rapidly than insured men. In spite of the fact that the experience before 1863 and the experience from 1863 to 1893 are based on English lives, and the M.-A. Table on American lives, they are well comparable because the mortality of insured lives in England is very nearly like the mortality of the northern part of the United States, which is the residence of the bulk of the insured entering into the M.-A. Table experience.

With the exception of residents in a few certain localities and excepting those who are pregnant, we are now taking women on the same terms as we do men. Previous to 1895 we charged an extra premium of \$5.00 per thousand; in that year we discontinued the extra but put them in a special dividend class, but, since 1903, following an investigation of our experience, they have been accepted without extra charge or special class proviso, and we believe, with most careful selection on our part, they may be regarded as first-class in every particular.

Sometime ago we made a special study of pregnant applicants: Data taken from the *Statistical Journal*, Vol. LXI, year 1898, page 531, shows that an observation of 115,669 confinements in New South Wales, causing 813 deaths, gives the following death-rates:

Probable deaths	1st confinement	8.7 per thousand confinements		
	2d	"	4.6	" " "
	5th	"	5.2	" " "
	10th	"	9.7	" " "
	13th	"	16.8	" " "

If arranged according to the ages of mothers, the confinement death-rate is lowest at ages 22 to 26 and increases rapidly after that age.

The Registrar-General's Statistics of Great Britain gives the following death-rates per thousand confinements:

1881- 85	4.94
86- 90	4.53
91- 95	5.49
96-1900	4.70
1901- 05	4.27
06- 07	3.93

Other reliable figures were obtained indicating three times as great a mortality for primiparæ as for multiparæ.

From a study of the above, as well as our own experience with pregnant women, we have adopted the following rules:

1. No pregnant woman to be accepted after the sixth month of gestation.

2. Primiparæ over 30 postponed.

3. All pregnant women over 40 are postponed.

4. In other favorable cases of pregnancy a single extra premium is to be charged.

a.—Primiparæ, up to age thirty      \$10.00 per thousand

b.—Multiparæ, up to age forty      5.00 per thousand

#### DISCUSSION

Dr. Wells—Dr. Jaquith was to discuss this paper, but being unable to be here this afternoon, he has delegated that pleasant duty to Dr. Patton.

Dr. Patton—I do not like to dispute the word of our President, but he delegated that pleasant duty to me just before we went to luncheon.

We formerly insured women at an increased premium rate. Some few years ago, following certain investigations, we made some changes in our methods of handling women applicants. The question of occupation is in our opinion of considerable importance. If a woman is self-supporting or if she has dependents, she is from an insurable interest standpoint a better risk than one who has no dependents, one who is not self-supporting. The statistics as quoted by Dr. Rockwell bear that out from a purely statistical standpoint, no matter what



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the other reasons are back of it, so that this question is of importance in our consideration of women applicants. Our limit used to be \$2000. We now give as high as \$5000 on a woman applicant with all physical reports favorable, provided we are satisfied concerning the beneficiary, or other possible speculative features in the case. We do not insure a woman making her husband the beneficiary unless he carries an equal amount of insurance, either with us or with some other reliable company. We formerly required that the husband should carry insurance with the Prudential, but we have dropped that, provided he carries an equal insurance with other reliable companies. We will insure her up to whatever his limit is provided it is not above our limit for women.

The question of pregnancy was given careful consideration at our office several years ago. We used to follow practically the line Dr. Rockwell states, of six months, giving them insurance of \$500.00, our intermediate policy. Investigation showed that a great many intermediate policies were taken out on women and a quarterly or semi-annual premium paid, and after the child was born the policy was dropped. We found we had rather a large mortality on some of those cases, so that about two years ago we declined to give even the \$500.00 intermediate policy to a woman who was pregnant no matter whether she was a primipara or not.

We are more careful in the selection of the risk than in the average male risks, in certain investigations, not only as to health, but other matters, but outside of those features, the amount and the question of pregnancy, we insure them on practically the same terms as male lives, no excess premium charged,—with this single exception, a case of hysterectomy or ovariectomy, we will give only an intermediate policy, not over \$500.00, and that on an endowment plan.

Dr. Wells—It is very easy to put the blame on the Chairman but if you knew how these young men had been clamoring to have a part in this discussion, you would believe the Chair. I will now call on Dr. Daley to continue this discussion.

Dr. Daley—Far be it from me to contradict the word of my



chief! Dr. Rockwell has covered the ground so thoroughly, from the viewpoint of the Equitable, that I have very little to say, excepting along the line that Dr. Patton brought out, and that is, the moral hazard. In 1911, Mr. Hunter, in presenting a paper before the Actuarial Society, entitled—"The Selection of Risks"—being the first introduction of the numerical system—spoke of the value of moral hazard in connection with a risk, and he detailed the different kinds of moral hazard. For instance, the following types are considered to come within the meaning of moral hazard:

1. Amount of insurance applied for apparently in excess of means, especially if premiums are payable quarterly. That applies very strongly to women.

2. A large amount of insurance applied for when no previous insurance is carried. That also applies very strongly to women, because of our lack of a thorough examination.

3. A large amount of insurance applied for on the life of a young person, when the parents have limited means. This applies to young girls who stay at home, and we automatically limit the amount of insurance on young people anyway.

4. Insurance applied for on the lives of elderly women whose children are self-supporting and where there is apparently no insurable interest.

5. Insurance applied for on the life of a woman in favor of her husband who is not insured.

Those are the main features of the moral hazard as they apply to women. Any company which depends upon the haphazard selection of women by agents is bound to have a rather high mortality, and if a company is going to insure women they need the coöperation of the Executive to a considerable extent. Unless you develop women agencies and go out after women and solicit their applications just as actively as men, you will get 1% of self-selection against you which you cannot overcome by medical selection.

Dr. Porter—This is an interesting subject, particularly so to me, because of the fact that for fifteen years I devoted myself to gynecological and obstetrical work, and the experience

quoted by the Doctor in his paper bears out the well-known fact that the advance in obstetrical detail has been responsible for a good percentage of the improvement. Furthermore there is a factor in the improvement of technic in the work done by gynecologists. When we contrast the mortality experience as shown by hospital records of fifteen years ago, with those of to-day, it is most striking, and that factor should be borne in mind in the consideration of the acceptance of risks.

As to the question of the influence of pregnancy and child-bearing, our rule is to accept multiparæ even during pregnancy, provided previous labors have been entirely normal, and our experience thus far certainly warrants our continuing this practice. The mortality rates in private practice and in lying-in asylums furthermore justifies the procedure. The feature that the Doctor speaks of, among the multiparæ, where they have had several children, is interesting and should be given careful thought. I doubt very much, however, if those figures will be borne out by subsequent observation covering a period, we will say, of the next five to ten years.

The impossibility of obtaining accurate histories from women is a well-known fact, as any of us who have had large experience as examiners know. The fact that the average woman does not appreciate the importance of accurate statements in connection with a business contract or a business deal, accounts for many of the differences in our mortality experience, but the change during the periods outlined by Dr. Rockwell in his paper is chiefly attributable to the improvement both in obstetrical and gynecological technique. Improvement in the inspection of risks and instruction in the methods and ways of getting at facts will result in an improved mortality experience among women, so that we may liberalize rather than add to the discrimination against them in the question of acceptance for life insurance.

Dr. Wells—I am very glad that Dr. Porter brought out these points. I will now call upon Dr. Rockwell to close the discussion.

Dr. Rockwell—I have nothing to say, Mr. President, in

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closing the discussion, except to thank the gentlemen for the interest they have displayed.

Dr. Wells—I am sure that if I were to put it to a vote that we have this subject as an annual feature, it would be carried unanimously. We come now to one of the best papers of the whole program, one of the most interesting, to be presented by one who has given a great deal of thought to the subject. It is our last subject, and is entitled: "The Heart and its Irregularities." I hope that every one will remain while this paper is read, because it is very interesting, instructive, and well worth hearing. I will call upon Dr. Chapin to read his paper.

### THE HEART AND ITS IRREGULARITIES

BY LAURENCE D. CHAPIN, M.D.,

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Springfield, Mass.*

#### I.—INTRODUCTION

In recent years a notable advance has been made in our knowledge of the physiology and pathology of the heart beat. Ever since Dr. Martin read his comprehensive paper on cardiovascular examinations at our meeting in 1911, much has been done to clarify our understanding of the cardiac arrhythmias. The recent work along this line has been of great value to the practising physician in that it has enabled him to discriminate between important and unimportant irregularities and to treat with more intelligence the serious abnormalities in rhythm. To us also it is of much interest, for if some of these arrhythmias are really unimportant and do not affect longevity, we should be ready to accept some risks which have been rejected in the past. It is perhaps still too early to make any change in policy in this respect, but the subject has seemed to me a profitable one to bring up for discussion at this meeting.

## II. PHYSIOLOGY OF THE HEART BEAT

The complete beat of the normal heart consists of a contraction of its chambers in an orderly sequence. The wave of contraction starts in a small mass of tissue embedded in the right auricle at the mouth of the superior vena cava. This mass of tissue consists of a network of specialized muscle cells richly supplied with nerves, and is known as the sino-auricular node. The contraction originating here spreads through the walls of both auricles and transmits a stimulus to the ventricles through the auriculo-ventricular node and bundle—a narrow neuromuscular band of tissue which originates in the right auricle near the coronary sinus and runs forward and downward to the interventricular septum where it divides into two main branches—one on either side of the septum. These branches subdivide and their branches are distributed to the ventricular musculature. Cardiac muscle possesses the physiological property of rhythmic contraction. The rhythm of the normal heart originates in the sino-auricular node, which Lewis has termed the heart's pacemaker. The pacemaker sends forth waves of contraction at an average rate of 72 per minute, the systoles following each other at regular intervals. The two auricles contract simultaneously and transmit the impulse through the auriculo-ventricular bundle to the ventricles which contract simultaneously one fifth of a second later.

## III. DEFINITION OF THE ARRHYTHMIAS.

A. Sinus Arrhythmia. The pacemaker is under the control of the vagi which normally exert a considerable restraining influence upon this stimulus-producing center. Under certain conditions the inhibitory action of the vagus is excessive. This inhibition may be persistent or rhythmic. If persistent, it causes uniform slowing of the pulse, as for example in pregnancy and in convalescence from the acute fevers. If rhythmic, it produces a gradual slowing followed by

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a gradual acceleration of heart rate, with the separate contractions normal in every respect. This is sinus arrhythmia, in which the rhythm of the heart is interfered with at its source. Such an arrhythmia is that observed in young adults when they breathe deeply. The pulse quickens while the chest is expanded and slows when the chest is emptied.

B. Ectopic Auricular Beats (Premature Contractions). The impulse to contract may arise not in the sino-auricular node as it should, but elsewhere in the auricular musculature. The resulting contraction of the auricle is termed ectopic because it originates at an abnormal source. The contraction itself is normal and transmits a normal impulse through the auriculo-ventricular bundle to the ventricle, which contracts normally. The ectopic contraction differs from the contraction arising at the sinus node, however, in two important respects. The impulse which gives rise to it is formed at a phenomenally rapid rate, so that the contraction is premature; and the impulse lacks a definite tendency to repeat itself, so that the contraction is isolated. The normal rhythm of the whole heart is thus abruptly but only momentarily disturbed by a single premature contraction and then continues to be governed by its pacemaker.

C. Ectopic Auricular Rhythms. Under certain conditions a portion of the auricular musculature may become so irritable that it not only is the source of an occasional premature beat, but develops into a new center of impulse formation, and if it originates contractions at a rate faster than that set by the sino-auricular node, this new center for the time being dominates the movements of the whole heart. This phenomenon is termed by Lewis dislocation of the pacemaker. The resulting heart rhythm is rapid, regular and uniform, of abrupt onset and abrupt termination. The abnormal focus is not under the control of the inhibitory nerves, as the sinus node is, and is less influenced by general conditions. The heart rate depends upon the irritability of the new center, and is limited only by the heart's ability to maintain the circulation. These "runs" of premature auricular beats have been grouped according to

the rate of contraction and the clinical symptoms into three more or less distinct divisions:

1. *Paroxysmal Tachycardia*, in which the auricle contracts regularly at a rate under 250, the ventricle maintaining the rate set by the auricle.

2. *Auricular Flutter*, in which the auricle contracts at the rate of 250 to 400 or over per minute. The ventricle cannot follow this pace, but selects impulses coming from the auricle so that some degree of heart-block is almost invariably present.

3. *Auricular Fibrillation*, in which normal impulse formation in the auricle is replaced by stimulus production at multiple auricular foci. Coördinate contraction of the auricle is lost and instead there is twitching of the different muscle fibers throughout the chamber. The ventricle contracts rapidly and irregularly in response to a hail of impulses on the auriculo-ventricular node, and, if not helped, fails to maintain the circulation. This is the type of heart action which used to be called *delirium cordis*.

D. Nodal Rhythm. If the auriculo-ventricular node for any reason becomes more irritable than the sinus node, the impulse to contract will originate at this point and spread thence in both directions, so that auricle and ventricle contract simultaneously. This is known as nodal rhythm. It is rare and of academic interest only.

E. Ectopic Ventricular Beats (Premature Contractions). Premature contractions may originate in the ventricle as well as in the auricle. Normally the ventricle is absolutely dependent for its stimuli upon impulses descending from the auricle. If an impulse arises at some point in the ventricular musculature more irritable than the auriculo-ventricular node, the ventricle responds with a premature contraction and fails to respond to the next auricular impulse because its muscle is in the refractory state. It does respond to the second auricular impulse following, and after this momentary break normal rhythm is restored.

F. Ectopic Ventricular Rhythms ("runs" of premature ventricular contractions) are theoretically possible, the ab-



normal focus taking the place of the auriculo-ventricular node as ventricular pacemaker, but practically they do not exist. The severer grades would be incompatible with life.

G. Heart-Block. In the normally acting heart the ventricle contracts in response to impulses coming down from the auricle. The conduction time is normally one fifth of a second. When from any cause the tissue of the auriculo-ventricular node and bundle is impaired, conduction is interfered with, and the ventricle's response to auricular impulses is delayed or prevented. In mild grades of heart-block all that is noticed clinically is an occasional dropped beat. In the severer grades ventricular silences are more frequent and simpler ratios are established between auricular and ventricular rates. When the ventricle beats at only half the rate of the auricle the condition is spoken of as 2:1 heart-block, etc. The final grade of heart-block is reached when no impulses are transmitted to the ventricle. There is complete dissociation between auricle and ventricle and entirely independent rhythms are maintained, the auricle beating at the normal rate, the ventricle at about 30 per minute.

H. Pulsus Alternans is a condition in which the left ventricle while beating regularly expels larger and smaller quantities of blood at alternate contractions. The ventricular contractions are regular and each is preceded at a normal interval by an auricular contraction. The origin of this condition is obscure.

#### IV. CLINICAL CHARACTERISTICS AND SIGNIFICANCE OF THE ARRHYTHMIAS

1. *Sinus arrhythmia* is most common in early life. It is generally respiratory, but may be observed during exercise or sleep. It is always due to alteration in vagal tone. It is really a normal rhythm arising at the normal source, presenting gradual variations in rate under varying physiological conditions. It signifies merely a variation in sensitiveness of the sinus node due to nervous or chemical influences.



2. *Premature contractions* or extra-systoles, as they used to be called, are a phenomenon of advancing years. It is probable that the majority of people who live beyond middle life are affected in this way at some time or another. In young adults excessive tobacco smoking is undoubtedly an exciting cause of the temporary appearance of these beats. Digestive disturbances sometimes bring them out. Among hospital patients with premature contractions Lewis found a large group which showed no organic lesions of the heart and no functional impairment save the irregularity. On the other hand this condition is often associated with cardiac disease, notably myocardial degeneration, aortic incompetence, and mitral stenosis. Premature beats arising in the auricle appear to be less often associated with organic disease than beats arising in the ventricle. Lewis tabulates 30 patients presenting ectopic auricular contractions, 11 of whom were free from cardiac disease and 4 were apparently healthy. Of 91 patients presenting ectopic ventricular beats, 67 had cardiovascular disease. 16 were free from cardiac disease, and 8 were apparently healthy.

Premature contractions vary in frequency. They are very rare when the heart rate exceeds 120. They are abolished by fever and by exercise but are brought out by fatigue after either, also by suspension of respiration, by pressure on the abdomen, or by change in posture (erect to recumbent). They are very often unnoticed by the patient. When numerous they may cause distress and therefore anxiety. As a rule, it is not the premature beat itself which is noticed but the long pause which follows it and the apparently unusual force of the succeeding heart beat. If a number of premature beats succeed each other at short intervals there may be faintness and cold sweating. Premature contractions are not influenced by treatment.

3. *Paroxysmal tachycardia* occurs at all ages after the first decade. In half the cases there is no history of previous illness. Rheumatic fever is a not uncommon antecedent, and malaria, measles, scarlet fever, and syphilis have apparently been causa-

tive in some instances. In a series of 45 cases Lewis found 28 with cardio-vascular disease and 16 without it. In cases which came to autopsy the most prominent and frequent lesions were in the walls of the heart. The most common exciting causes of the paroxysm itself are exertion, emotion, and digestive disturbances. The paroxysm may last anywhere from a few seconds to two weeks, but the usual duration is several hours. In a given case it is fairly constant. Symptoms may be slight or absent but usually there is throbbing of the vessels of the neck, palpitation and discomfort in the chest. As the attack proceeds, exhaustion, coldness, sweating, flatulence, salivation, nausea and vomiting occur, and in long paroxysms there are anginal pain and signs of dilatation of the heart. Death may result, but ordinarily normal circulation is rapidly restored when the abrupt fall in pulse rate occurs. Attacks of paroxysmal tachycardia may cease at any time, never to return. If the attacks are infrequent and short and the rate not excessive, and there is no other indication of myocardial damage, they ordinarily do not curtail life.

4. *Auricular flutter* is comparatively rare and is usually seen in later life, although cases have been reported as early as the third decade. Usually no previous infection can be traced, but rheumatic fever, syphilis, and gout are apparently sometimes responsible. It is often associated with arteriosclerosis and there are nearly always some signs of myocardial degeneration. The patient does not feel the rapid circulation as in paroxysmal tachycardia, but is conscious of "fluttering" in the region of the heart. Flutter often persists for months or years and the patients are able to be about, the subjective symptoms consisting merely of fatigue after slight exertion although the ventricle beats persistently at 150 or over. Once present, flutter establishes itself. The condition, however, can be checked by the use of digitalis in a special way and when checked the cause of its persistence is removed and normal rhythm is restored.

5. *Auricular fibrillation* may occur at any age. Rheumatic fever is an important etiological factor. Among 152 cases

collected by Lewis, 66% were of rheumatic origin. The prevalence of fibrillation among patients with mitral stenosis was especially noteworthy—52% of this series had this lesion. Practically all of the cases had some form of cardio-vascular disease. Fibrillation is always evidence of serious muscular damage. The patient presents irregular palpitation of the heart and the symptoms of myocardial insufficiency. Treatment consists of the judicious use of digitalis and brilliant results can frequently be obtained, the moribund being restored and many years added to their lives.

6. *Heart-block* may occur at any age. It is not infrequent during the course of infectious diseases, especially rheumatic fever and its complications, less frequently diphtheria, influenza, pneumonia, and the pyogenic infections. In chronic heart-block the principal etiological factors are rheumatism, syphilis, and arteriosclerosis. It means widespread affection of the heart muscle, especially of the bundle of His. Heart-block can be produced by toxic doses of digitalis, also experimentally by stimulation of the vagus, but efforts to establish a clinical group in which heart-block is attributable to disturbance of innervation have been unsuccessful. The pathological lesions in the conduction bundle, in cases of acute block, are acute inflammation with deposition of leucocytes, ulceration, and parenchymatous degeneration; in chronic block, chronic inflammation, fibrosis, atrophy, calcification, gummata, and (rarely) tumors. Heart-block is usually an indication of a more serious condition than simple interference with the auriculo-ventricular bundle, for disease of the myocardium is rarely limited to the bundle.

The symptoms of heart-block are variable. In block of high degree there may be no subjective symptoms and no physical signs except a very slow pulse, or there may be any degree of myocardial insufficiency. As a direct result of excessive slowing of the pulse evidences of cerebral anæmia may appear—faintness, convulsive seizures, loss of consciousness—the Stokes-Adams syndrome. The lesser grades of heart-block usually produce no symptoms. After an acute

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infection in which heart-block has been present the normal mechanism is generally recovered. Heart-block, though not in itself dangerous to life, is therefore always of grave prognostic significance.

7. *Pulsus alternans* is associated either (1) with tachycardia or (2) with angina pectoris, hypertension, myocarditis, and nephritis. In the latter case it is always a very bad prognostic sign.

### V. DIFFERENTIAL DIAGNOSIS OF THE ARRHYTHMIAS.

The differentiation of these various types of cardiac arrhythmia is manifestly of the greatest importance. The means at our command are of two kinds: data acquired by clinical observation, and graphic records of the pulse and cardiac impulses obtained by instrumental means. I will not try to describe these methods in detail but merely outline them.

A. Clinical Methods. First, let us consider the clinical diagnostic points.

1. *Sinus arrhythmia* presents a gradual slowing and quickening of the pulse rate, following the respiratory cycle. This can always be brought out by deep breathing. The radial pulse and apex-beat correspond, and the radial beats are full and uniform. The irregularity is abolished by any factor which materially increases the pulse rate, *e.g.* exercise. These considerations are sufficient for the diagnosis of sinus arrhythmia.

2. In the case of single *premature contractions* the physical signs depend upon whether the aortic valves are forced open or not by the abnormal beat. If these valves are forced, a feeble pulsation is noted in the arterial pulse and auscultation reveals early first and second sounds which together with the two normal sounds of the preceding rhythmic beat form a group of four. If the abnormal contraction is not strong enough to force the aortic valves, a prolonged pause is noted at the wrist and the stethoscope discovers only a premature first sound which with the two sounds of the preceding rhythmic beat form a group of three. When premature contrac-

tions are very frequent, the physical signs are still further complicated, so that the arterial pulse may be grouped in twos or threes (pulsus bigeminus or trigeminus), or be halved, and the two normal heart sounds may alternate with or give way to groups of four or three sounds. Still more complex sounds are heard when a premature contraction raises the pulmonic but not the aortic valves, the pulmonic second sound being present, the aortic second absent. This phenomenon has been erroneously described as hemisystole. These considerations, taken in conjunction with the clinical symptoms are generally sufficient for the recognition of premature contractions. The differentiation of auricular and ventricular premature beats, however, is not always possible without instrumental examination.

3. The recognition of *paroxysmal tachycardia* is not difficult. The attack begins abruptly and ends abruptly. Apex beat and radial pulse generally coincide but the pulse volume may vary. In patients who suffer periodically from tachycardia, the presence of occasional premature beats during the intervals suggests strongly that the tachycardia is due to new rhythm production.

4. *Auricular flutter* can sometimes be recognized by clinical means. A regular and uniform ventricular action of 130 to 160 persisting for months or years and uninfluenced by rest, exercise, or posture is almost certainly flutter.

5. *Auricular fibrillation* is recognized clinically by the nature of ventricular action. The pulse is hopelessly irregular in force and rhythm, and almost any kind of sound or pause is heard with the stethoscope. A ventricle beating irregularly at 120 or more to the minute almost always means auricular fibrillation. As the rate increases, the pulse becomes more irregular, while in other conditions (e. g. premature contractions, partial heart-block) it steadies down.

6. *Heart-block* can often be recognized by simple clinical means. When the interval between auricular systole and ventricular systole is widened, the sound produced by auricular systole, inaudible in a normally beating heart, may be heard so

that the first heart sound is reduplicated. If the delay in conduction is greater, auricular systole may fall in early diastole, causing a double second sound. In cases with single dropped beats the stethoscope discovers absence of sound synchronous with the pulse pause. This condition can be confused only with sinus arrhythmia, but the diagnosis is easily made by noting the effect of respiration on the rhythm present: 2:1 heart-block is suggested when the ventricle beats regularly at 40 to 50, or if there is a sudden and exact halving of ventricular rate. Rates under 35 almost always mean dissociation. In this condition each ventricular beat has a first and a second sound, and in the long diastoles the auricular systoles are faintly heard.

7. *Pulsus alternans* can generally not be recognized without instrumental means.

B. Instrumental Methods. Clinical data are not sufficient for diagnosis in many cases. Simple radial pulse tracings are of some assistance, but these do not give information about auricular contraction or the time relations of the movements of auricle and ventricle.

1. *The polygraph* records graphically the separate contractions of these chambers and their time relations. The writing levers are connected with the heart apex; the radial artery and the jugular vein, and the curves from the three sources are written simultaneously on the moving film. With this instrument it is possible for an expert to differentiate with practical certainty all the arrhythmias.

2. *The electrocardiograph* records not mechanical contraction but an electrical disturbance set up in heart muscle at the time of contraction—in other words, the impulse to contract. The hands of the patient are placed in jars of salt solution which are connected by wires to a very sensitive galvanometer, the movement of which is recorded on a moving film by means of a lantern. The impulses from auricle and ventricle write very characteristic "complexes" on the film, and from a study of the record it is comparatively easy for anybody to differentiate the arrhythmias.



## VI. CARDIAC ARRHYTHMIAS AND MEDICAL SELECTION

Now, to turn to the essential point of this paper. Have these very recent studies of the heart beat any practical value for us in medical selection? Is it time yet for us to accept some of these risks which we have rejected in the past? Let us consider the several forms of arrhythmia separately.

1. *Sinus arrhythmia* is really a normal rhythm manifesting transient instability of its controlling nerve supply. It is not of real pathological significance and should not bar an applicant from life insurance.

2. *Premature contractions* do the heart little harm in themselves. Although they are evidence of a pathological process in the heart, the resulting disturbance of cardiac function is not necessarily serious or permanent. We know that in some cases premature beats disappear, never to return. Even if permanent the subject may live on to old age without any other sign of cardiac disability. Some observers believe that premature contractions are of such little prognostic importance that they can always be disregarded. They certainly are relatively insignificant. Lewis says that the majority of hearts which show premature contractions never present more profound derangements. On the other hand, the profounder derangements have the same pathological basis and are more likely to occur in hearts in which single premature contractions have been common.

A history of premature contractions in the past should not impair an applicant if the present condition of the heart is normal in every respect. The abnormality was transient and insurance at standard rates should be issued without hesitation. When premature beats are present at examination we cannot be so confident. The mortality in such applicants as a group will be high, but many of them will live out their expectancy and, if they can be selected, should not be denied insurance. Can we discriminate? Can we satisfy ourselves in a given case that longevity is not affected? It seems to me that the best we can do in these cases is to postpone action for



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several months and re-examine the applicant at frequent intervals. If on careful observation over a sufficient period there can be found no other abnormality in the cardio-vascular system and the heart responds normally to functional tests (e.g., exercise, posture), the risk can safely be accepted at standard rates.

3. No person subject to attacks of *paroxysmal tachycardia* can be considered for life insurance, even if the paroxysms are brief and infrequent and the heart absolutely normal in the intervals. The underlying disturbance of cardiac nutrition must be serious. This condition, however, sometimes disappears, never to return, so that the mere history of it need not bar one from insurance. Nevertheless, we should hardly be justified in accepting an applicant who had not been free from this abnormality for a good many years.

4. *Auricular flutter*, past or present, is an absolute bar to insurance. It is practically always associated with myocardial degeneration. *Auricular fibrillation* is also an absolute impairment. No person who had ever suffered from it would be likely to apply.

5. *Heart-block* when present, is of course prohibitory. It is a manifestation of extensive myocardial damage. The damage, however, may be only transient, as for example in the acute infections, so that a history of heart-block should not in itself be an impairment. We should want to be satisfied, however, that several years had elapsed since the condition was present.

6. *Alternation of the pulse* deserves only passing mention. It is a signal of distress from the heart, and would never come up for consideration in our work.

7. In considering the relation of the cardiac arrhythmias to medical selection it has occurred to me that the *electrocardiograph* may prove to be of real value in our branch of medicine. The clinical methods of differentiating the irregularities are complicated and not always reliable, and frequently it is impossible to make a certain diagnosis without instrumental means. If in the future we are to accept applicants presenting

any one of the abnormalities in cardiac rhythm, the electrocardiograph would be of great assistance in guiding us. For example, it would promptly discriminate between sinus arrhythmia and heart-block with frequent dropped beats, also between the higher grades of heart-block and premature contractions. It would distinguish simple tachycardia from auricular flutter. It is conceivable that a person with flutter might present himself for insurance examination, for such a patient is able to be about and his symptoms are slight. Moreover, in the periodic examination of policy holders, especially those of long standing, it might occasionally discover flutter or fibrillation, in either of which conditions it is possible by suitable treatment to add many years to the patient's life. The instrument might also be used with profit in the examination of applicants who had recently had one of the acute infections prone to damage the heart muscle and its conduction apparatus—especially rheumatic fever, diphtheria, and streptococcus infection—to determine whether any permanent defect inappreciable to stethoscope and palpating finger remained.

#### VII. SUMMARY AND CONCLUSIONS

In this paper I have attempted to set down in orderly fashion the results of the recent studies of cardiac rhythm, describing the physiology of the heart beat and the pathology of its abnormalities. I have also outlined the clinical characteristics and significance of the arrhythmias and the methods of differentiating them, in order to apply our comparatively new knowledge to medical selection. I feel justified in concluding that it is safe to accept as standard risks applicants presenting sinus arrhythmia, and after careful observation certain of those with premature contractions. Persons subject to paroxysmal tachycardia, auricular flutter or fibrillation, or showing heart-block or alternation of the pulse are not insurable. A history of paroxysmal tachycardia or of heart-block, however, does not impair a life if a sufficient time has

elapsed since the condition was present. The electrocardiograph is of the greatest value in differentiating the arrhythmias and may prove to be of assistance to us in selecting our risks and increasing the longevity of our policy holders.

In conclusion, I wish to acknowledge my indebtedness to Thomas Lewis whose book *Clinical Disorders of the Heart Beat* I have used freely in the preparation of this paper, also to Dr. Paul Lamson of Johns Hopkins for many helpful suggestions. The whole subject has interested me very much and I hope that I have suggested a few points worth discussing.

Dr. Wells—A very fine paper. I wish we had more time to digest and discuss it at this meeting. I will call upon Dr. Whitney to offer any suggestions for discussion at this time.

Dr. Whitney—Mr. President and Fellow Members, this most excellent paper leaves little for discussion. Personally, I confess that I am still old-fashioned enough to still consider the irregularities of the heart and pulse as abnormal and not insurable at normal rates. The more severe conditions we know are decidedly uninsurable, those especially in the younger men. Those irregularities of the heart and pulse that we can show conclusively are temporary are insurable after a time. Personally we feel that they are not insurable at the time but require postponement and further examination. We know what that means, because it is difficult to get many of our examiners to clear up the difficulty. Occasionally, however, a case may come under our observation that we can control, for instance at the Home Office or in one of the larger cities, where we have every confidence in our examiner, and there an occasional irregularity of the heart, put to a hard test, examination of the urine, and the other clinical factors at our disposal, we are able to take a chance on and give some kind of a policy, but personally we feel that they are still abnormal and uninsurable at the ordinary rates so long as that trouble appears.

Dr. Wells—Has any one else a word to offer in the discussion of this paper?

Dr. Porter—I would like to ask Dr. Chapin if he would

give us the name of the best electro-cardiograph that would be at all applicable to our Home Office use and the approximate price of same. Also I would like to ask him in those cases of arrhythmia what would be the influence of age. Our practice is to accept cases prior to the age of forty, where there is sufficient evidence of the individual peculiarity, where the applicant has been told of it in childhood, the condition has always been known to exist; past the age of forty we do not accept them. I would like to ask his opinion bearing upon such a course.

Dr. MacKenzie—Mr. President and Gentlemen, I am sorry that this paper had to be postponed until so late an hour that so few of the members of the Association are here to hear it.

I have been particularly interested in the subject of cardiac impairments for several years. A couple of years ago I got up something over two thousand of our approved cases, and looked them over with a view to seeing how many of the previous records had been "q'd" within anywhere from thirty days up to several years and was amazed to find the large number that had been "q'd" within a short time. Now when we "q" functional cardiac trouble, or heart murmur, or hypertrophy, within almost a few days of another report, it simply means one of two things, that the first report was incorrect, and the result of a faulty report by that examiner, or the report we got was incorrect, and there was some cardiac abnormality present. I will admit of course that a condition might have existed and cleared up in between, but if it did clear up it seems to me that with a careful and searching examination of the heart, and examination of the pulse, under varying conditions, it would have been possible in most cases to state whether or not that heart was normal or abnormal at the time of the first examination.

Now with regard to Dr. Chapin's paper, I appreciate it very much. It is an excellent summary of the recent work that has been done in cardiac diseases.

There are only two of the irregularities that are really of interest to us as insurance men, namely, sinus arrhythmia and

premature contractions. The others practically cut themselves out because the heart rate is so much beyond our limit of acceptance. There is one exception to that rule, perhaps, and that is the 2:1 heart-block. In that case it would be quite possible to have a pulse of 80 and an auricular beat of 160, but one would expect to find present a condition of the heart that would bar acceptance.

Now we have heard a great deal to-day about the education of the examiner, and about urinalyses. I do not think there is any place where there is a more crying need for the education of our examiners than in connection with examination of the heart, and irregularities of the pulse, and it seems to me that this Association would render the companies it represents a great service by proceeding to educate their examiners along these lines, and it would also render the examiners in the field a great service because you know a number of our examiners are very busy men, practicing all the time, and it is not an easy thing for them to read up sufficiently along one special line to become entirely proficient in it, but I think we could, through pamphlets and through personal interviews, call their attention to these things and get a great deal of improvement.

I heard Dr. Cabot of Boston state before the Academy of Medicine of Newark that any irregularity that cleared up after exercise could be considered functional, and Dr. Cabot's statement is borne out by the testimony of such men as Dr. Lewis. Sir James McKenzie in his work on the heart claims that premature contractions in young people may practically be disregarded, and he gives an instance of a young man who came to him, who had been warned as to the condition of his heart, the seriousness of it, and after examination he told the fellow to go ahead and play football. Now this young man had premature contractions. He went on and played football, and was none the worse for it, in spite of the fact that he had been doomed to a life of invalidism by a number of other excellent physicians.

Dr. Hirshfelder claims we can practically disregard premature contractions under fifty years of age, provided there

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are no symptoms of cardiac trouble, and the physical examination is otherwise satisfactory. It seems to me that this is an exceedingly important subject for us, and one that we could all profit by, by having a further discussion of, and further papers on, at future meetings of the Association.

Dr. Coolidge—For the last two years I have been accustomed to send out a letter in the case of questionable circulatory disturbance, a letter reading something like this: "Please tell us the effect of exercise on the heart sounds and on the rate and rhythm of the pulse." A review of those replies it seemed to me might be interesting. I looked over 107 of them, and nearly all came between the ages of twenty and forty—ninety-two of them. Of those ninety-two, twenty-eight were regular on a review, and that review came within three weeks, both before and after exercise. After exercise, there were twenty-six that became regular that were irregular and intermittent before, and seventeen were reported not modified. There were forty-nine regular both before and after, twenty-six more which became regular after exercise, making a total of sixty-five cases which would apparently fall within either the sinus arrhythmia or the premature contractions, all of which might be considered on some plan of insurance at least.

Dr. Chapin—closing the discussion—With regard to Dr. Porter's question about the age of the applicant, I agree with him that we should consider more serious any irregularity after the age of forty.

In regard to the price of the instrument, I am sorry that I cannot give you that. The Hindle instrument seems to us the most practical.

Dr. Porter—Most of them are very large and cumbersome. We have found them impracticable.

Dr. Gage—I think I express the feelings of all the men who have attended this most interesting meeting and been entertained here so handsomely, that it is our wish to express our appreciation of the kindness of the officers of the Equitable Life Assurance Society in extending to us the hospitality of



the building, and I move that a vote of thanks be extended to them.

Motion seconded and carried.

Dr. Wells—I desire to express my thanks to all the members of the Association for their attendance. It has been the largest attendance in the history of the Association, and I thank you for the very cordial way you have taken hold of the work and prepared these splendid papers.

Dr. Frank Wells—I should like to move on behalf of the Association a vote of thanks to our President for his services during the year, and for the extremely successful and valuable meeting.

Motion seconded and carried.

Dr. Wells—I should like to have Dr. Gage, our new President, come forward and stand before you. He will rule you for a year, and as severe as he looks I am sure he will be easy with you,—perhaps very much easier than I have been.

Dr. Gage was greeted with applause.

On motion, the meeting adjourned, *sine die*.

The annual dinner of the Association was held on the evening of Wednesday, October 25th, at the Hotel Martinique.

The following members were present at the dinner: Drs. W. W. Beckett, Charles D. Bennett, David N. Blakely, William B. Bartlett, Charles L. Christiennin, Henry Colt, John N. Coolidge, Robert M. Daley, E. W. Dwight, Olin M. Eakins, Z. Taylor Emery, John W. Fisher, Paul FitzGerald, R. A. Fraser, Homer Gage, F. L. Grosvenor, George C. Hall, W. F. Hamilton, William G. Hutchinson, Angier B.



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Hobbs, Walter A. Jaquith, A. J. Johnson, George E. Kanouse, William P. Lamb, Lewis F. MacKenzie, Charles F. Martin, John C. Medd, George L. Megargee, Archibald Mercer, John P. Munn, C. B. McCulloch, Henry A. Martelle, T. F. McMahon, William G. Nash, Spotswood H. Parker, J. Allen Patton, W. O. Pauli, John S. Phelps, Joseph E. Pollard, Wm. Evelyn Porter, Albert T. Post, T. H. Rockwell, W. Walter Rose, R. L. Rowley, Eugene F. Russell, Howard B. Speer, Brandreth Symonds, Paul E. Tiemann, Harry Toulmin, Henry G. Tuttle, G. A. Van Wagenen, William R. Ward, Joseph H. Webb, Wm. H. E. Wehner, Franklin C. Wells, C. F. S. Whitney, Thomas H. Willard, McLeod C. Wilson, Charles D. Wheeler, Harry P. Woley, Glenn Wood, and Arthur B. Wright.

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